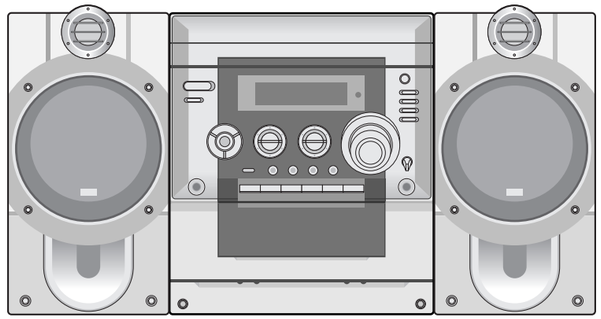
LG Electronics Inc.

SERVICE MANUAL MODEL: FFH-286A/AD, FE-286E

LG

3CD CHANGER
HI-FI SYSTEM
SERVICE MANUAL



MODEL : FFH-286A/AD, FE-286E

CONTENTS

SECTION 1. GENERAL

- SERVICING PRECAUTIONS ····· 1-2
- ESD PRECAUTIONS ····· 1-4
- SPECIFICATIONS ····· 1-5

SECTION 2. ELECTRICAL

- ADJUSTMENTS ····· 2-1
- TROUBLESHOOTING ····· 2-3
- WAVEFORMS OF MAJOR CHECK POINT ····· 2-7
- BLOCK DIAGRAM ····· 2-17
- SCHEMATIC DIAGRAMS ····· 2-19
- WIRING DIAGRAM ····· 2-27
- PRINTED CIRCUIT DIARGAMS ····· 2-29
- INTERNAL BLOCK DIAGRAM OF IC's ····· 2-38
- REPAIRS REGARDING CD MECHANISM ····· 2-45

SECTION 3. EXPLODED VIEWS

- CABINET AND MAIN FRAME SECTION ····· 3-1
- TAPE DECK MECHANISM: AUTO STOP DECK(OPTIONAL) ····· 3-3
- TAPE DECK MECHANISM: AUTO REVERSE DECK ····· 3-5
- CD MECHANISM ····· 3-7

SECTION 4. SPEAKER ····· 4-1

SECTION 5. REPLACEMENT PARTS LIST ····· 5-1

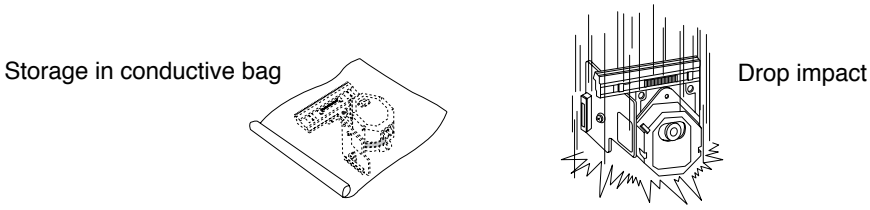
SECTION 1. GENERAL

SERVICING PRECAUTIONS

NOTES REGARDING HANDLING OF THE PICK-UP

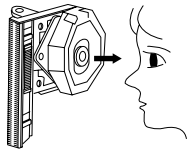
1. Notes for transport and storage

1) The pick-up should always be left in its conductive bag until immediately prior to use.
2) The pick-up should never be subjected to external pressure or impact.



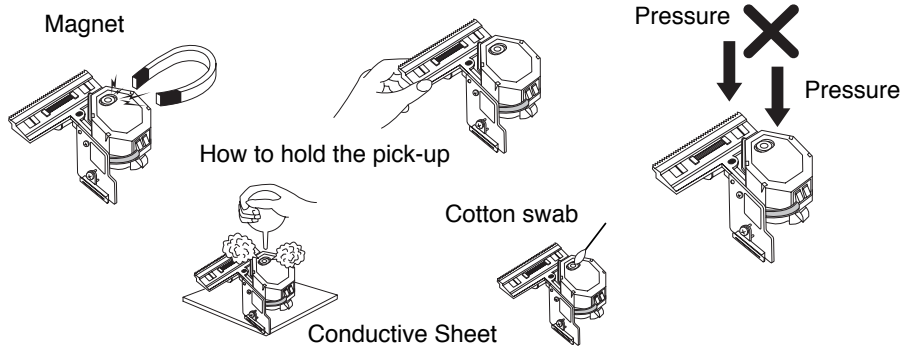
2. Repair notes

1) The pick-up incorporates a strong magnet, and so should never be brought close to magnetic materials.
2) The pick-up should always be handled correctly and carefully, taking care to avoid external pressure and impact. If it is subjected to strong pressure or impact, the result may be an operational malfunction and/or damage to the printed-circuit board.
3) Each and every pick-up is already individually adjusted to a high degree of precision, and for that reason the adjustment point and installation screws should absolutely never be touched.
4) Laser beams may damage the eyes!
   Absolutely never permit laser beams to enter the eyes!
   Also NEVER switch ON the power to the laser output part (lens, etc.) of the pick-up if it is damaged.



NEVER look directly at the laser beam, and don't let contact fingers or other exposed skin.

5) Cleaning the lens surface
   If there is dust on the lens surface, the dust should be cleaned away by using an air bush (such as used for camera lens). The lens is held by a delicate spring. When cleaning the lens surface, therefore, a cotton swab should be used, taking care not to distort this.



6) Never attempt to disassemble the pick-up.
   Spring by excess pressure. If the lens is extremely dirty, apply isopropyl alcohol to the cotton swab. (Do not use any other liquid cleaners, because they will damage the lens.) Take care not to use too much of this alcohol on the swab, and do not allow the alcohol to get inside the pick-up.

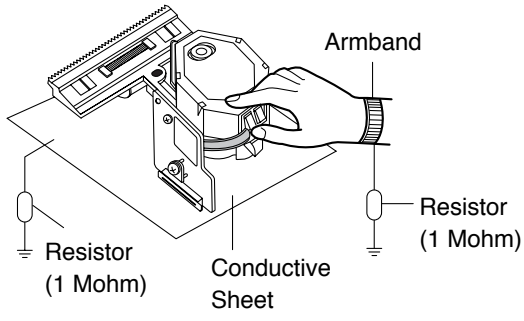
NOTES REGARDING COMPACT DISC PLAYER REPAIRS

1. Preparations

1) Compact disc players incorporate a great many ICs as well as the pick-up (laser diode). These components are sensitive to, and easily affected by, static electricity. If such static electricity is high voltage, components can be damaged, and for that reason components should be handled with care.
2) The pick-up is composed of many optical components and other high-precision components. Care must be taken, therefore, to avoid repair or storage where the temperature of humidity is high, where strong magnetism is present, or where there is excessive dust.

2. Notes for repair

1) Before replacing a component part, first disconnect the power supply lead wire from the unit
2) All equipment, measuring instruments and tools must be grounded.
3) The workbench should be covered with a conductive sheet and grounded.
   When removing the laser pick-up from its conductive bag, do not place the pick-up on the bag. (This is because there is the possibility of damage by static electricity.)
4) To prevent AC leakage, the metal part of the soldering iron should be grounded.
5) Workers should be grounded by an armband (1MΩ)
6) Care should be taken not to permit the laser pick-up to come in contact with clothing, in order to prevent static electricity changes in the clothing to escape from the armband.
7) The laser beam from the pick-up should NEVER be directly facing the eyes or bare skin.



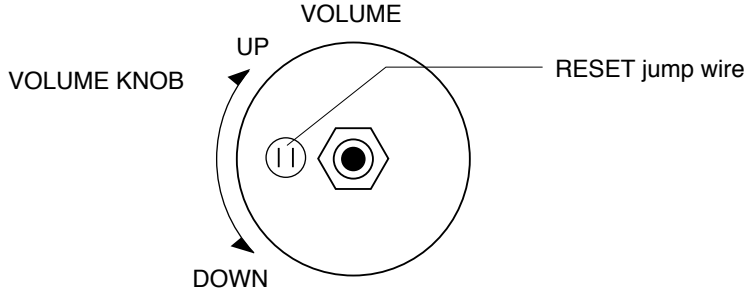
CLEARING MALFUNCTION

You can reset your unit to initial status if malfunction occur(button malfunction, display, etc.).

Using a pointed good conductor(such as driver), simply short the RESET jump wire on the inside of the volume knob for more than 3 seconds.

If you reset your unit, you must reenter all its settings(stations, clock, timer)

NOTE: 1. To operate the RESET jump wire, pull the volume rotary knob and release it.
2. If you wish to operate the RESET jump wire, it is necessary to unplug the power cord.



ESD PRECAUTIONS

Electrostatically Sensitive Devices (ESD)

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ESD devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ESD devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESD devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.
6. Do not remove a replacement ESD device from its protective package until immediately before you are ready to install it. (Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive materials).
7. Immediately before removing the protective material from the leads of a replacement ESD device, touch the protective material to the chassis or circuit assembly into which the device will by installed.

CAUTION : BE SURE NO POWER IS APPLIED TO THE CHASSIS OR CIRCUIT, AND OBSERVE ALL OTHER SAFETY PRECAUTIONS.

8. Minimize bodily motions when handing unpackaged replacement ESD devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ESD device).

CAUTION. GRAPHIC SYMBOLS

THE LIGHTNING FLASH WITH APROWHEAD SYMBOL. WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF UNINSULATED “DANGEROUS VOLTAGE” THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.

THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

SPECIFICATIONS

SECTION MODEL			FFH-286A/AD
	General	Power supply	Refer to the back panel of the unit
		Power consumption	30W
		Mass	5.70kg
		Extemal dimensions(W x H x D)	273 x 330 x 360mm
	CD	Frequency Response	40-18000Hz
		Signal-to-noise ratio	70dB
		Dynamic range	70dB
TUNER	**FM**	Tuning Range	87.5-108.0MHz or 65-74MHz, 87.5-108.0MHz
		Intermediate Frequency	10.7 MHz
		Signal-to-noise ratio	61/58dB
		Frequency Response	60-10000Hz
	AM	Tuning Range	522-1611kHz or 530-1610kHz
		Intermediate Frequency	450kHz
		Signal-to-noise ratio	35 dB
		Frequency Response	100-2000 Hz
	AMP	Output Power	5W + 5W
		T.H.D	0.3%
		Frequency Response	42-20000Hz
		Signal-to-noise ratio	80dB
	TAPE	Tape Speed	4.75cm/sec
		Wow Flutter	0.25% (MTT-111,JIS-WTD)
		F.F/REW Time	120sec(C-60)
		Frequency Response	250-8000Hz
		Signal-to-noise ratio	43dB
		Channel Separation	50dB(P/B)/45dB(R/P)
		Erase Ratio	55dB (MTT-5511)
	Speaker	**MODEL**	**FE-286E**
		Type	1 Way 1 Speaker
		Impedance	4Ω
		Frequency Response	80-20000Hz
		Sound Pressure Level	86dB/W(1m)
		Rated Input Power	5W
		Max.Input Power	10W
		Net Dimension(W x H x D)	180 x 326 x 165.8mm
		Net Weight	1.67kg

NOTE : Specification are subject to change without notice in the course of product improvement.

MEMO

SECTION 2. ELECTRICAL

ADJUSTMENTS

This set has been aligned at the factory and normally will not require further adjustment. As a result, it is not recommended that any attempt is made to modificate any circuit. If any parts are replaced or if anyone tampers with the adjustment, realignment may be necessary.

IMPORTANT

1. Check Power-source voltage.
2. Set the function switch to band being aligned.
3. Turn volume control to minimum unless otherwise noted.
4. Connect low side of signal source and output indicator to chassis ground unless otherwise specified.
5. Keep the signal input as low as possible to avoid AGC and AC action.

TAPE DECK ADJUSTMENT

1. AZIMUTH ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjustment	Adjust for
A Deck Playback	MTT-114	Speaker Out	DECK Screw Azimuth Screw	Maximum
B Deck Playback	MTT-114	Speaker Out	Azimuth Screw	Maximum

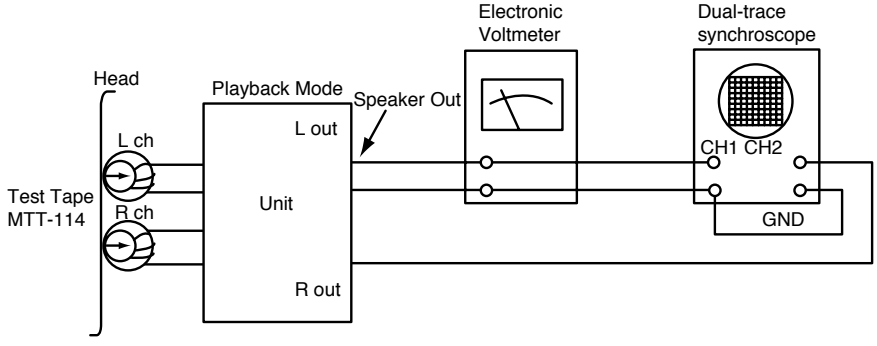


Figure 1. Azimuth Adjustment Connection Diagram

2. MOTOR SPEED ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjustment	Adjust for	Remark
Normal Speed	MTT-111	Speaker Out	VR201	3kHz ± 1%	A Deck
HI-Speed	MTT-111	Speaker Out	more than 5.4kHz		HI-Speed Dubbing Mode

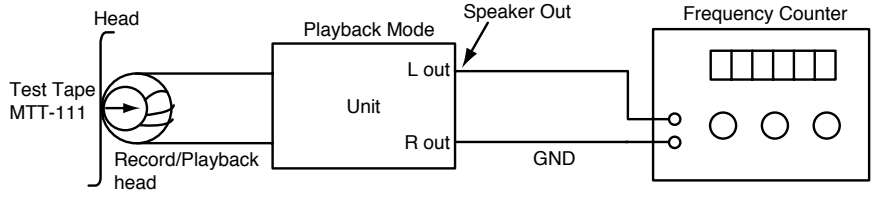


Figure 2. Motor Speed Adjustment Connection Diagram

3. RECORD BIAS ADJUSTMENT

Deck Mode	Test Tape	Test Point	Adjustment	Adjust for
Rec/Pause	MTT-5511	ERASE HEAD WIRE(PN202)	L203	60kHz±5kHz (Auto stop) 85kHz±5kHz(Auto Reverse)

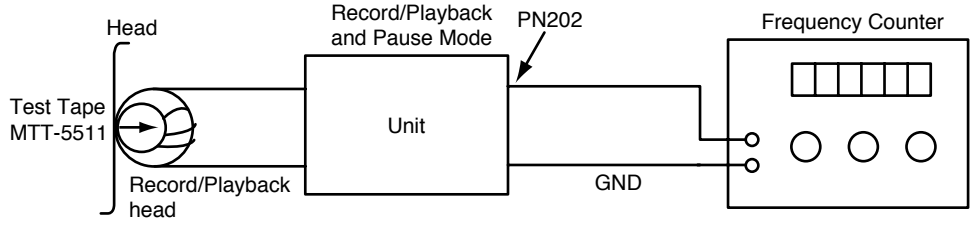


Figure 3. Record Bias Adjustment Connection Diagram

4. TUNER ADJUSTMENT

(FM)

Item	Test Point	Adjustment	Adjust for
DC Voltage	Checker IC Pin 26, 28	L106	0V±50mV

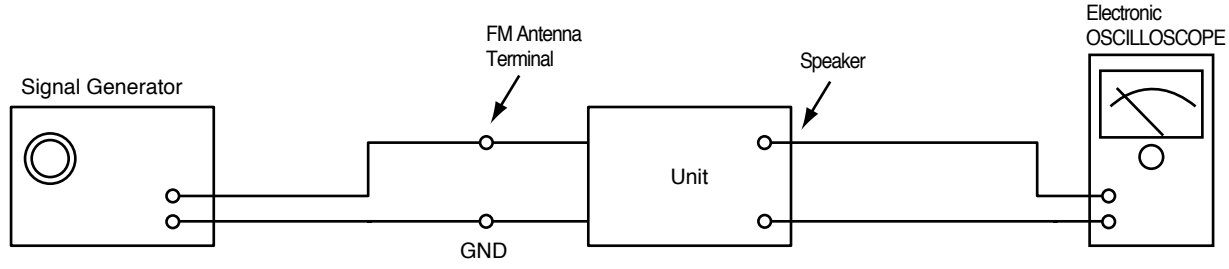
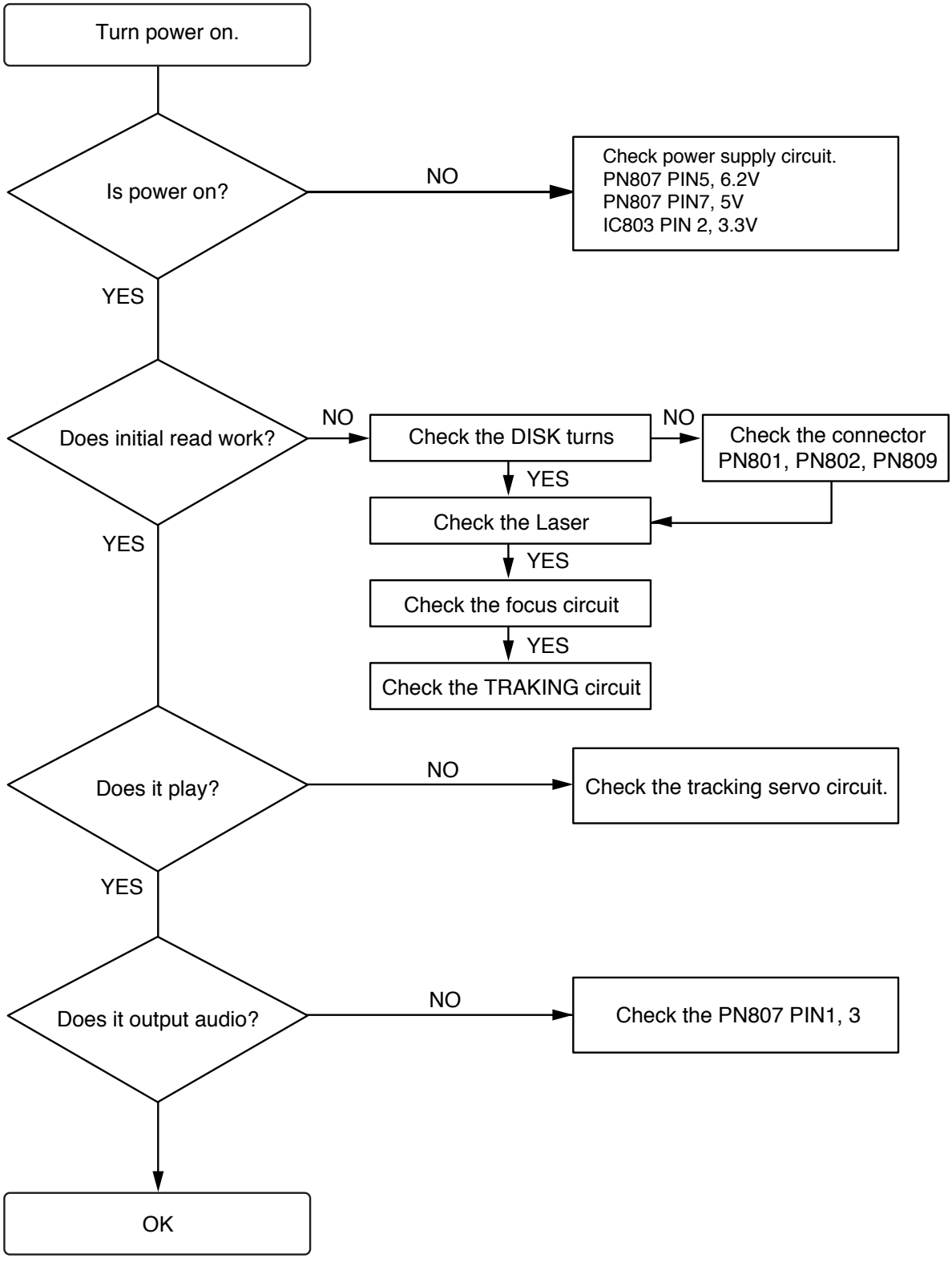
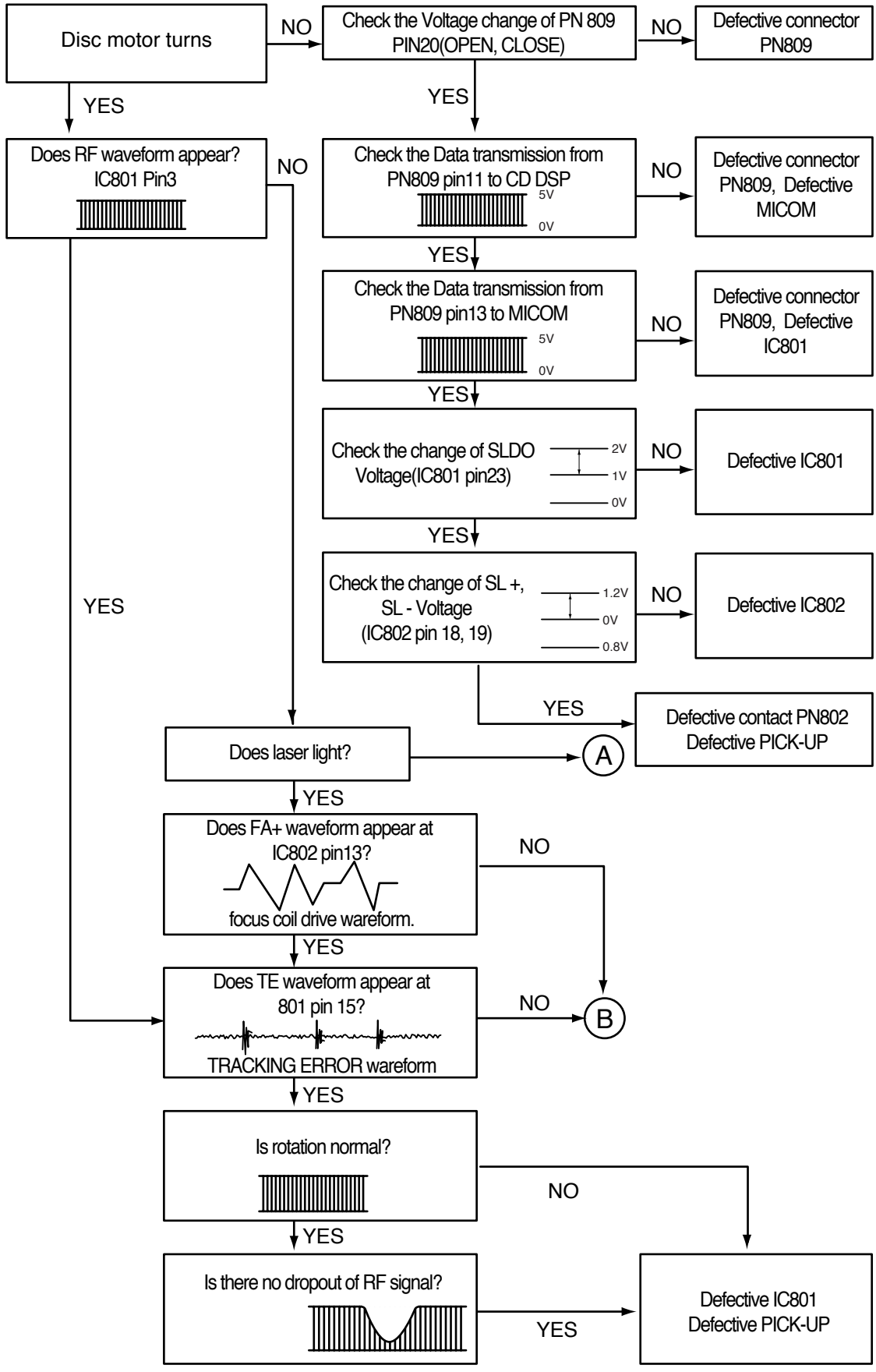


Figure 4. Tuner(S curve) Adjustment Connection Diagram

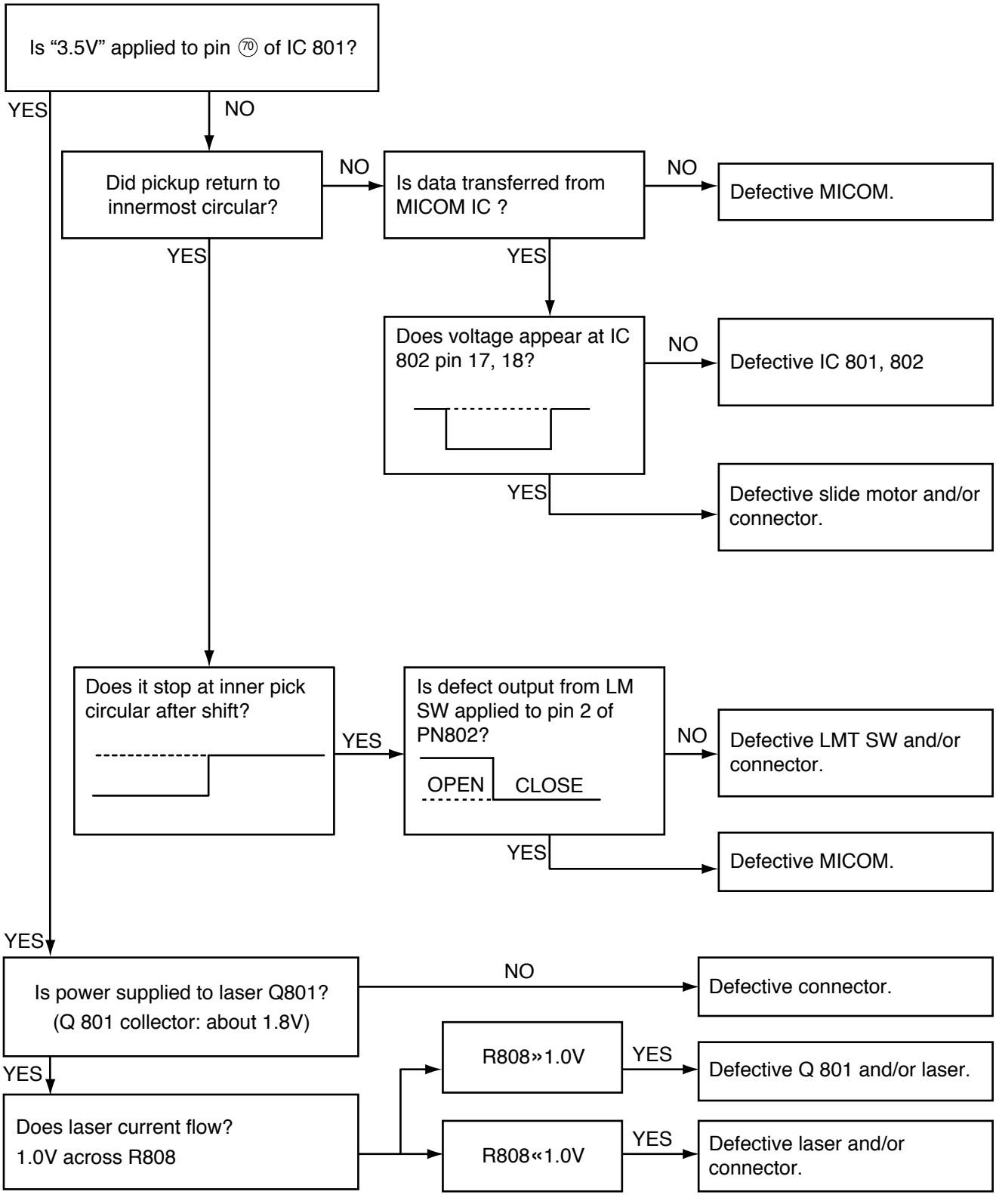
TROUBLESHOOTING

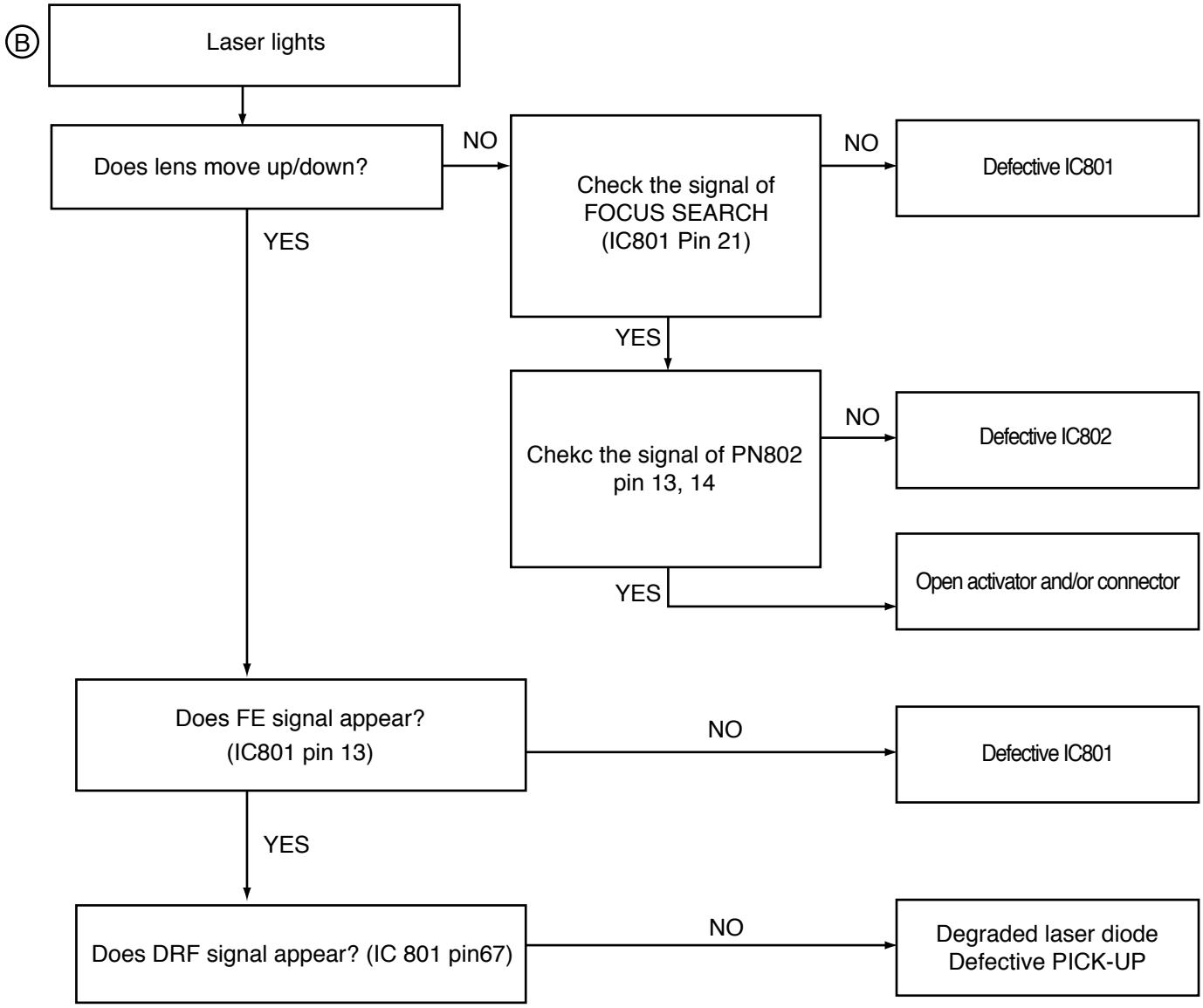


Fails to initial read



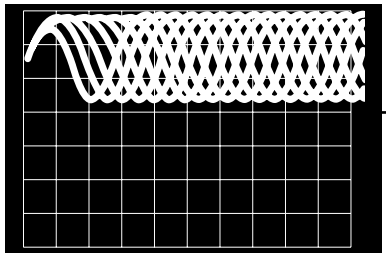
Ⓐ Laser does not light.



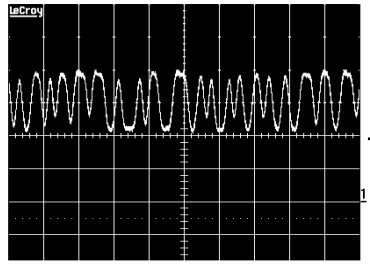

Ⓑ
Laser lights
Does lens move up/down?
NO
Check the signal of FOCUS SEARCH (IC801 Pin 21)
NO
Defective IC801
YES
YES
Chekc the signal of PN802 pin 13, 14
NO
Defective IC802
YES
Open activator and/or connector
Does FE signal appear? (IC801 pin 13)
NO
Defective IC801
YES
Does DRF signal appear? (IC 801 pin67)
NO
Degraded laser diode
Defective PICK-UP

WAVEFORMS OF MAJOR CHECK POINT

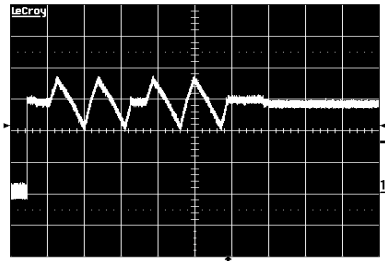
1. HF signal (RF signal) waveform
(IC801 pin 3) during normal play



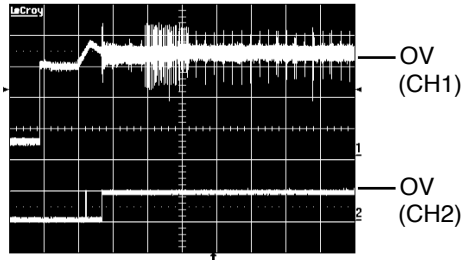
2. EFM signal (IC801 pin 3)waveform
during Normal Play



3. Focus coil drive waveform(IC802 pin13)
• When focus search failed or there is no disc on the tray

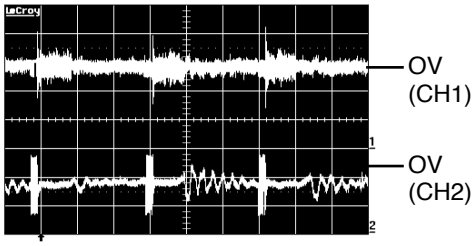


• Focus coil drive waveform(FDO: IC801 pin21) and
DRF(IC801 pin67) when focus search is accomplished



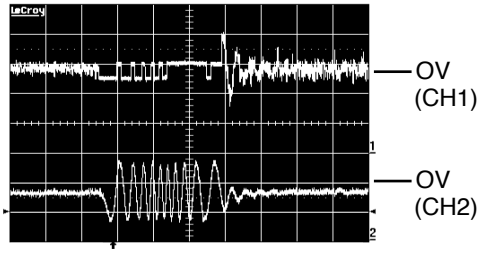
CH1 : FOCUS COIL DRIVE
SIGNAL 2V/Div.
CH2 : DRF

4. Tracking coil drive waveform and TE during track
traverse
(1) When time division is 20mS/Div.1V/Div.



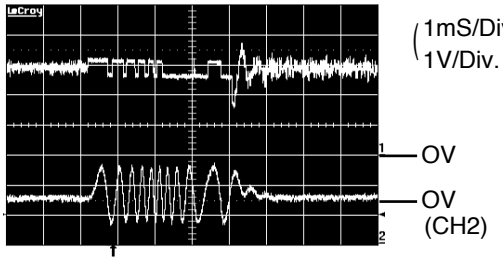
CH1 : TRACKING COIL DRIVE (IC802 pin27)
CH2 : TRACKING ERROR (TE: IC801 pin15)

(2) When time division 1mS/Div, 1V/Div
(During forward track traverse)



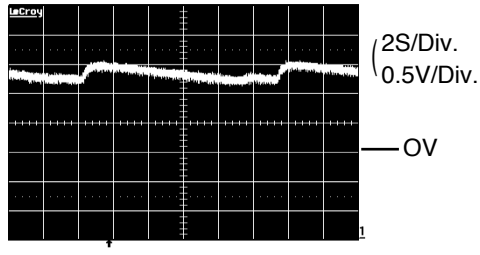
CH2 : TRACKING COIL DRIVE (IC802 pin27)
SIGNAL 2V/Div.
CH2 : TRACKING ERROR (TE: IC801 pin15)
1V/Div.

(3) When time division is 0.5nS/div.
(During backward Track Traverse)

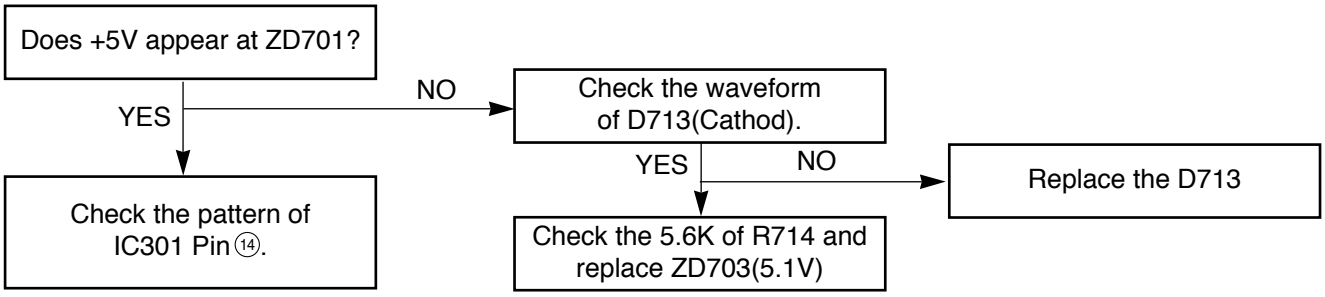


CH1 : TRACKING COIL DRIVE
SIGNAL 2V/Div. (IC802 pin27)
CH2 : TRACKING ERROR(TE: IC801 pin15)
1V/Div.

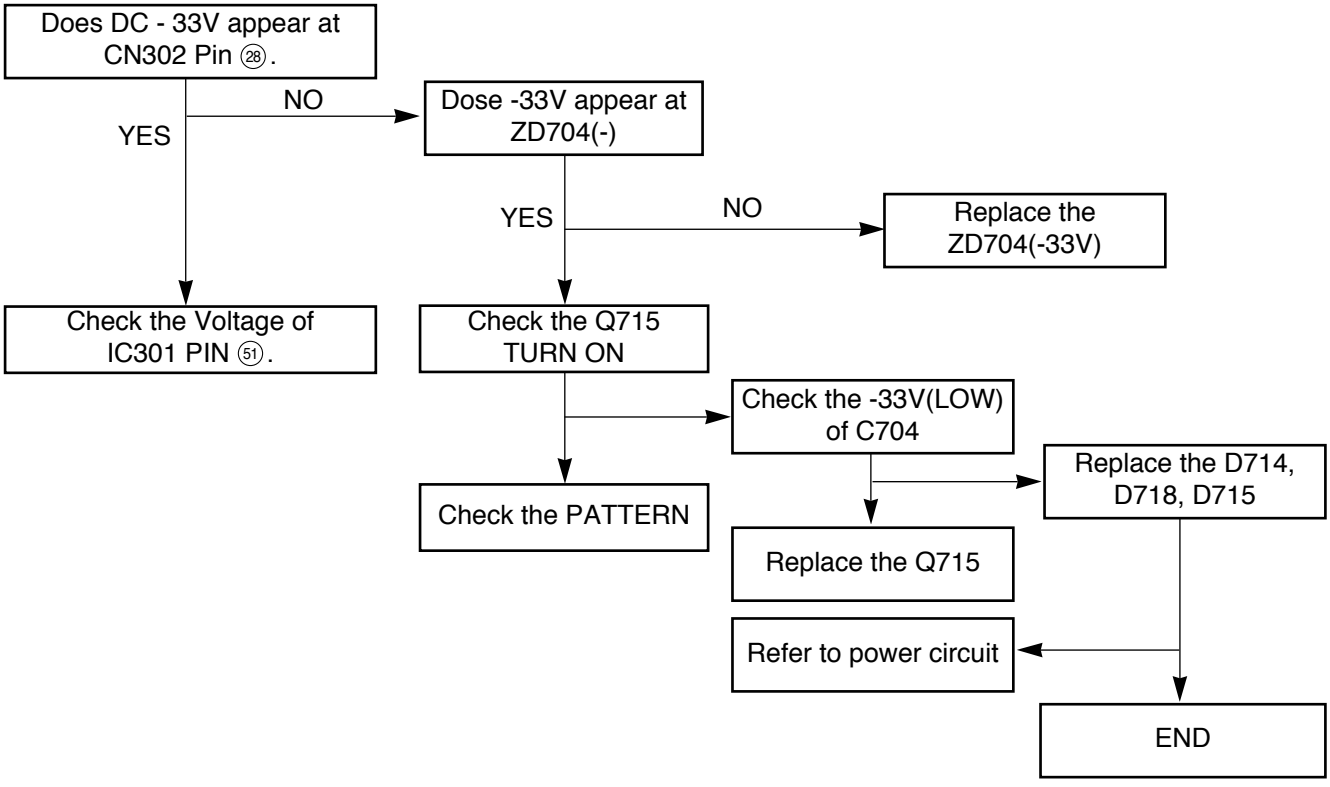
5. Feed motor drive waveform(IC 802 pin18)
During normal play



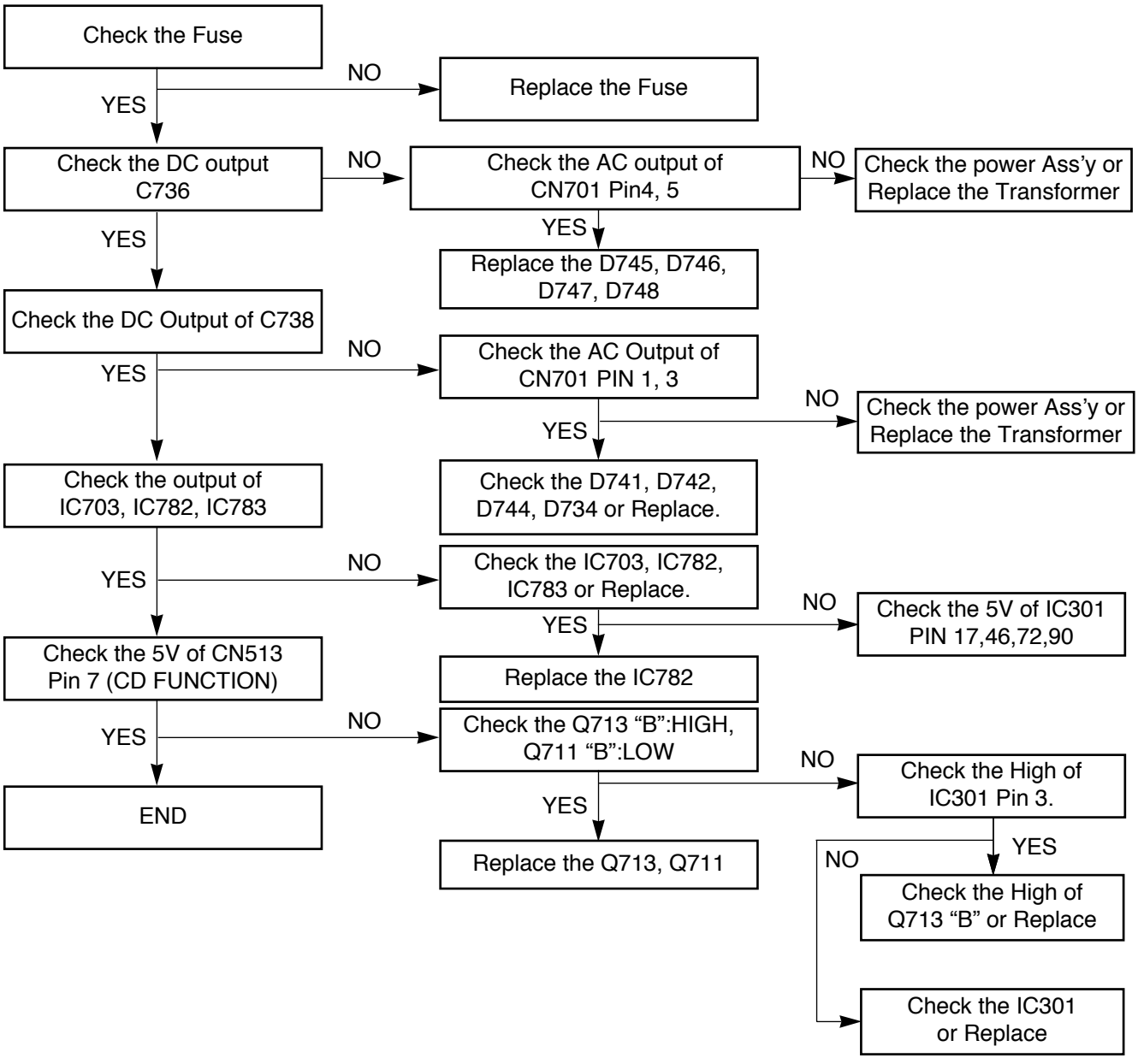
P-SENS PART



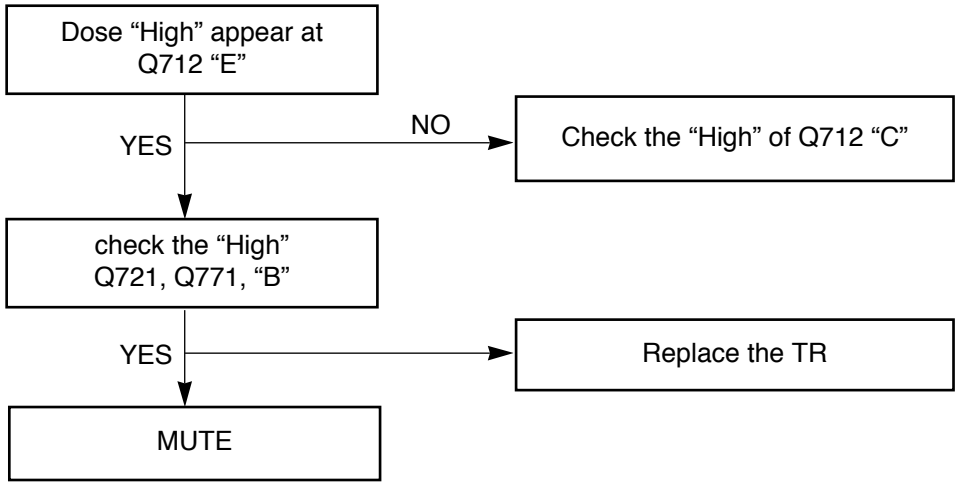
VKK PART



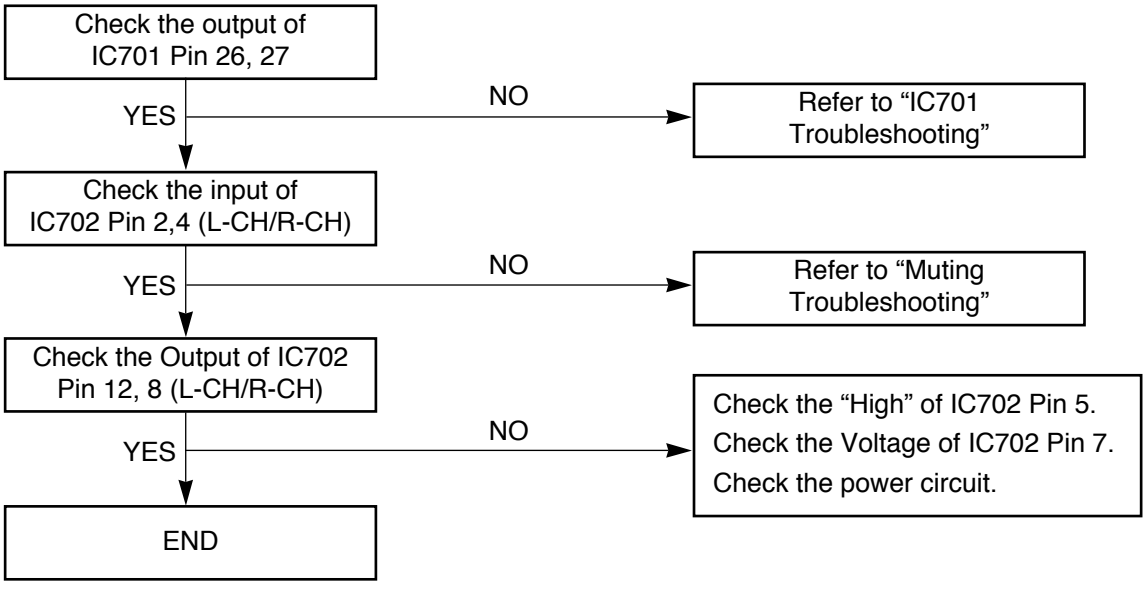
Power Circuit



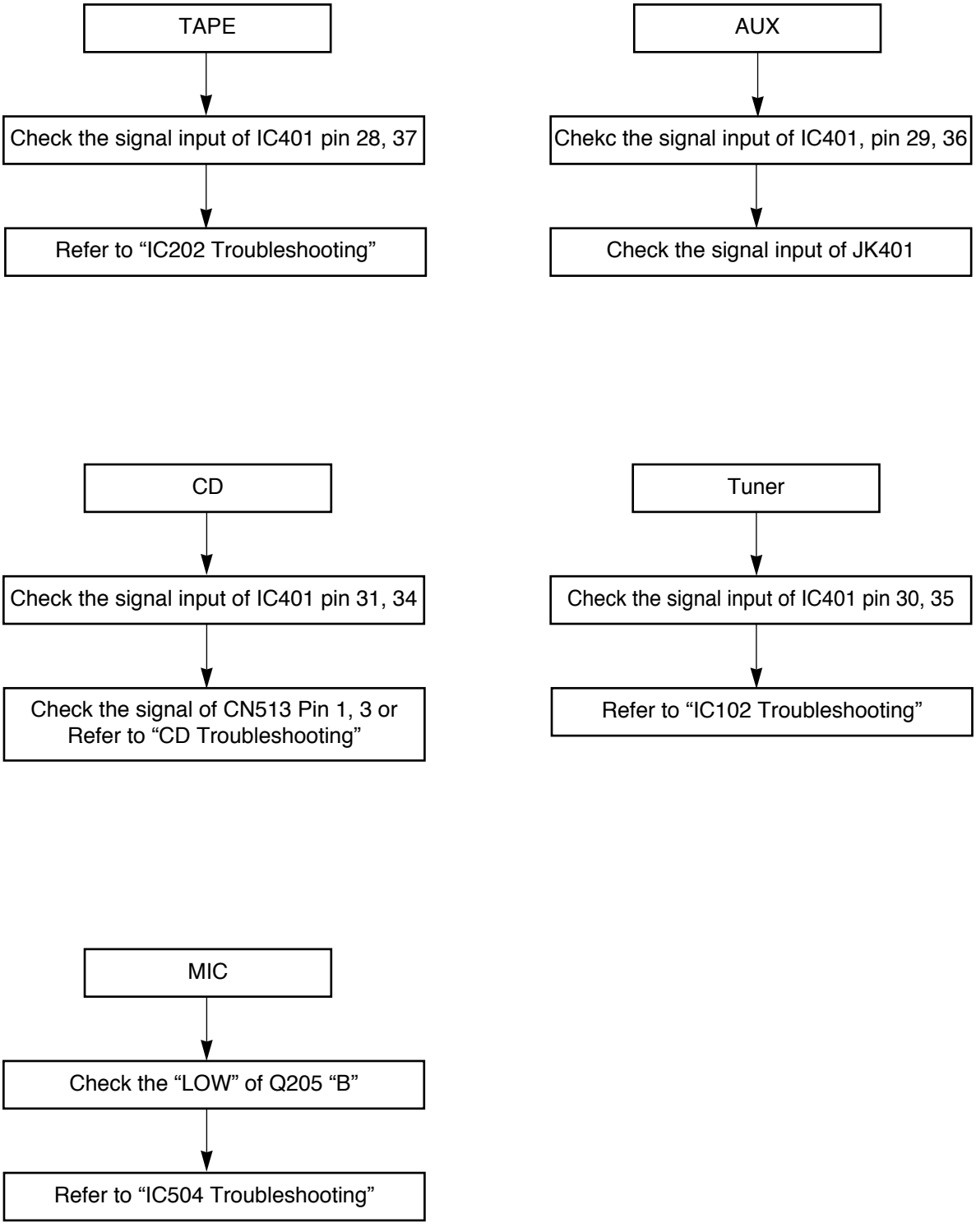
Muting circuit (MUTE)



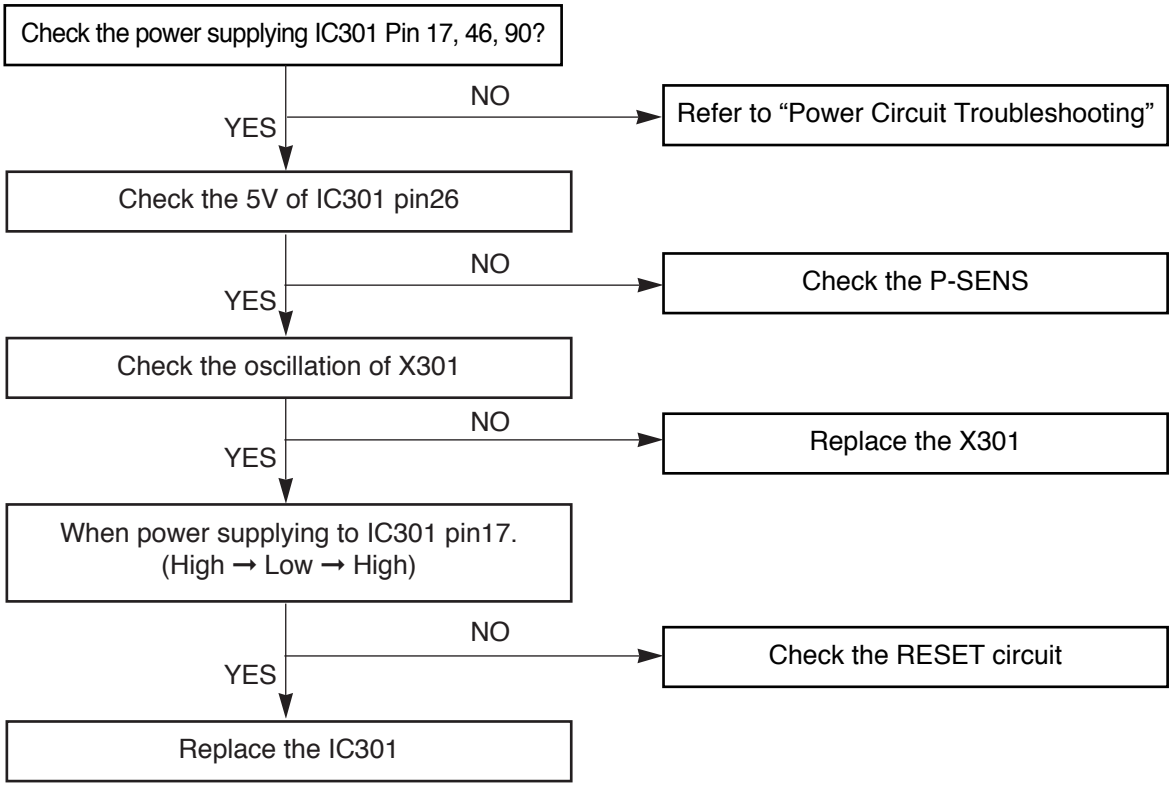
Audio abnormal



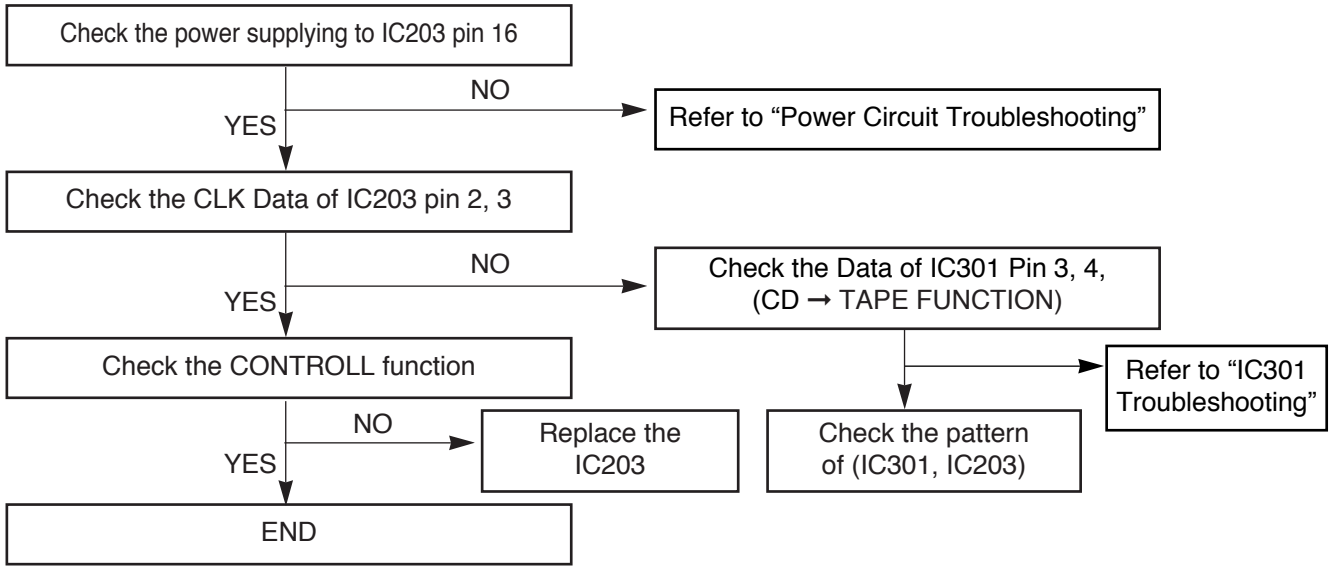
FUNCTION MODE Audio abnormal


TAPE
Check the signal input of IC401 pin 28, 37
Refer to “IC202 Troubleshooting”
AUX
Chekc the signal input of IC401, pin 29, 36
Check the signal input of JK401
CD
Check the signal input of IC401 pin 31, 34
Check the signal of CN513 Pin 1, 3 or
Refer to “CD Troubleshooting”
Tuner
Check the signal input of IC401 pin 30, 35
Refer to “IC102 Troubleshooting”
MIC
Check the “LOW” of Q205 “B”
Refer to “IC504 Troubleshooting”

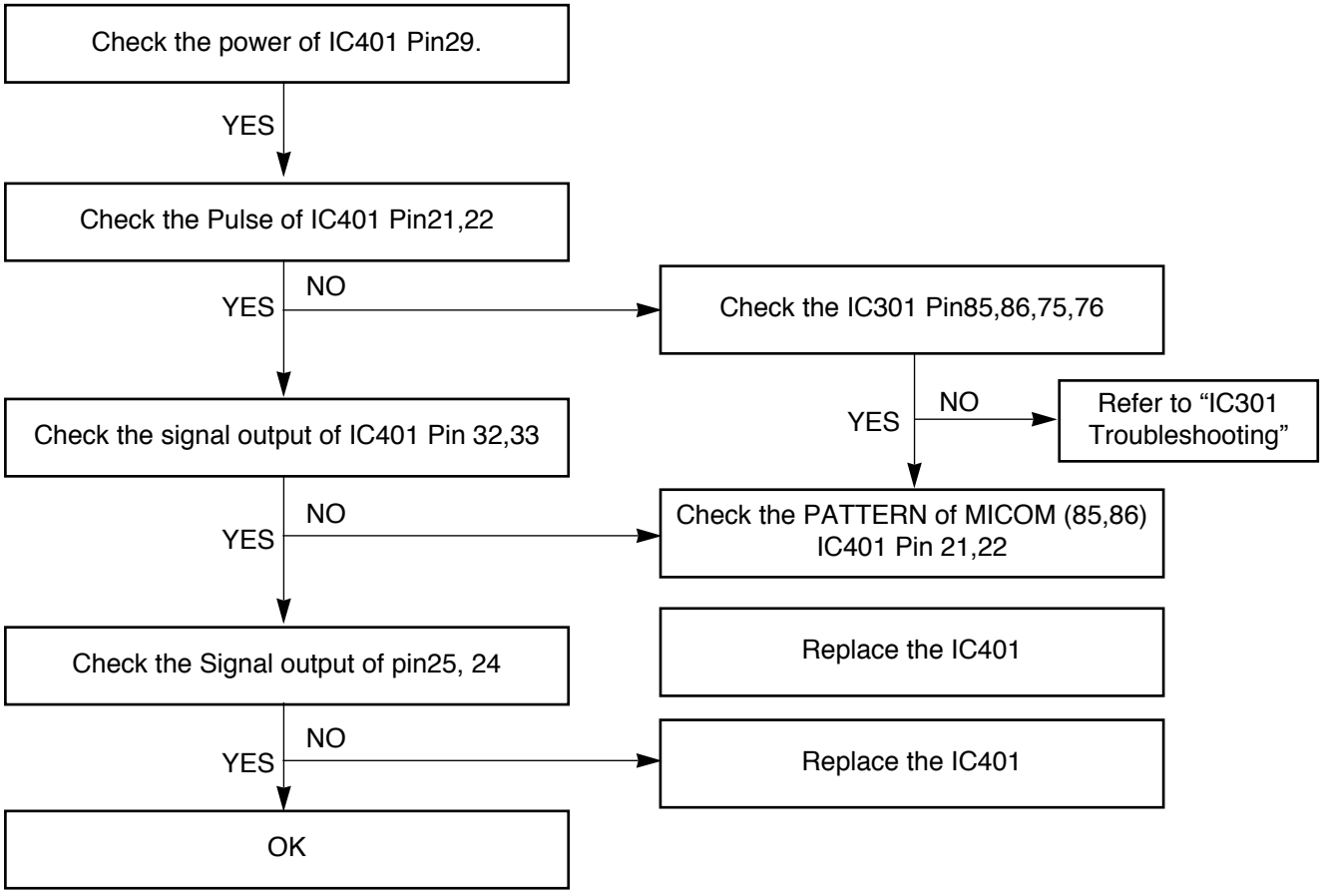
IC301 Troubleshooting



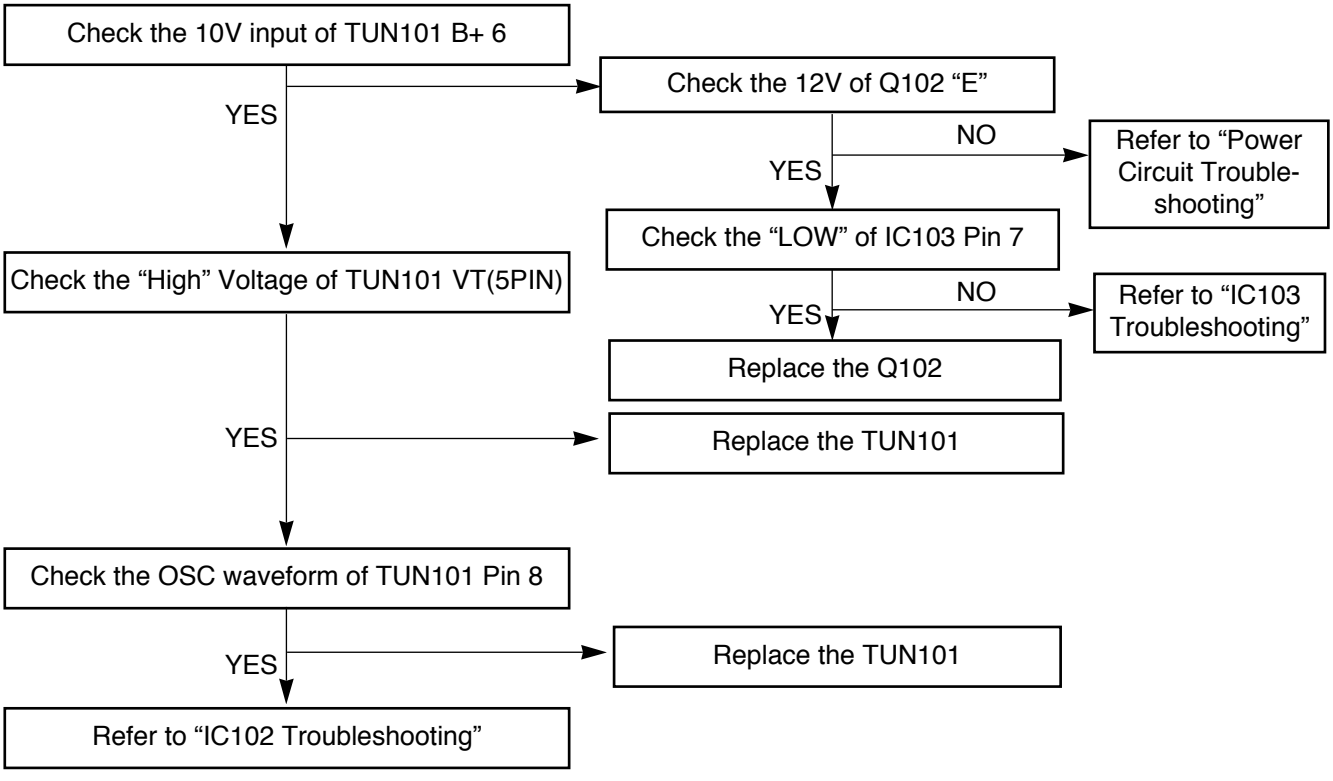
IC203 Troubleshooting



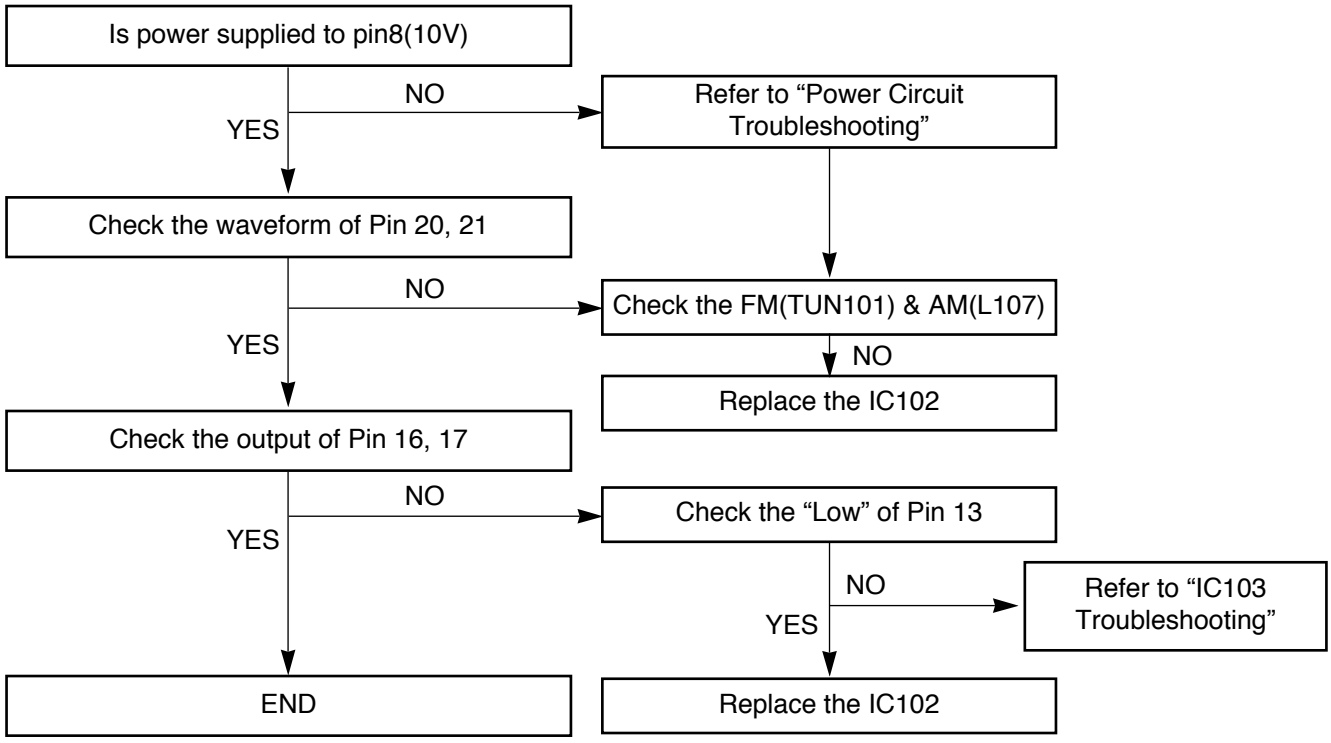
IC401 Troubleshooting



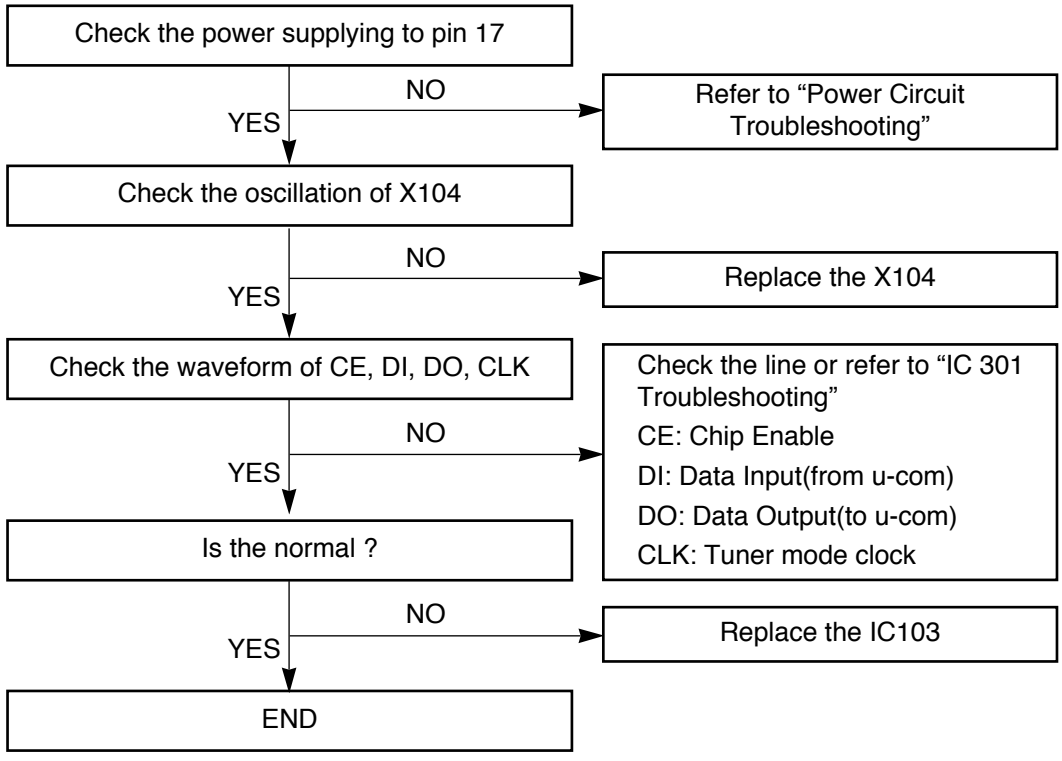
FM (TUN101)



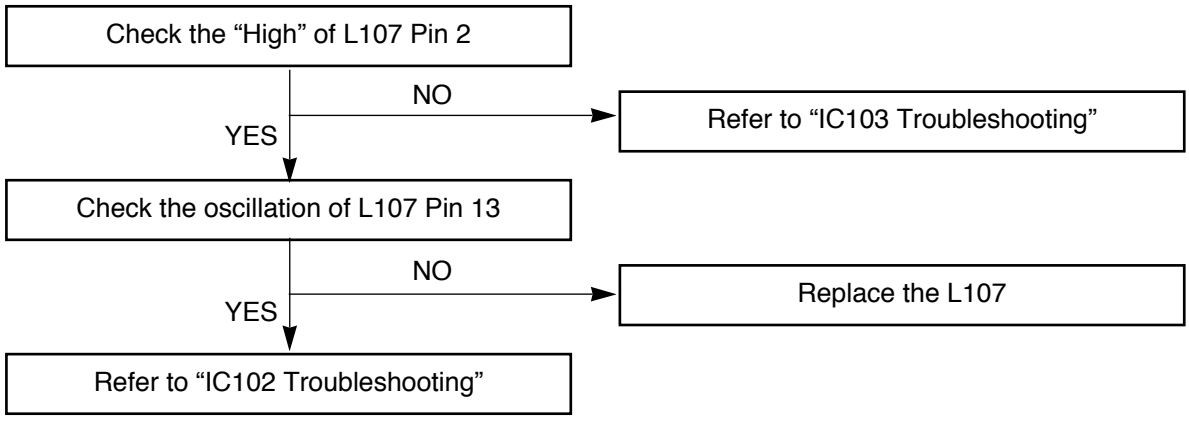
IC102 Troubleshooting



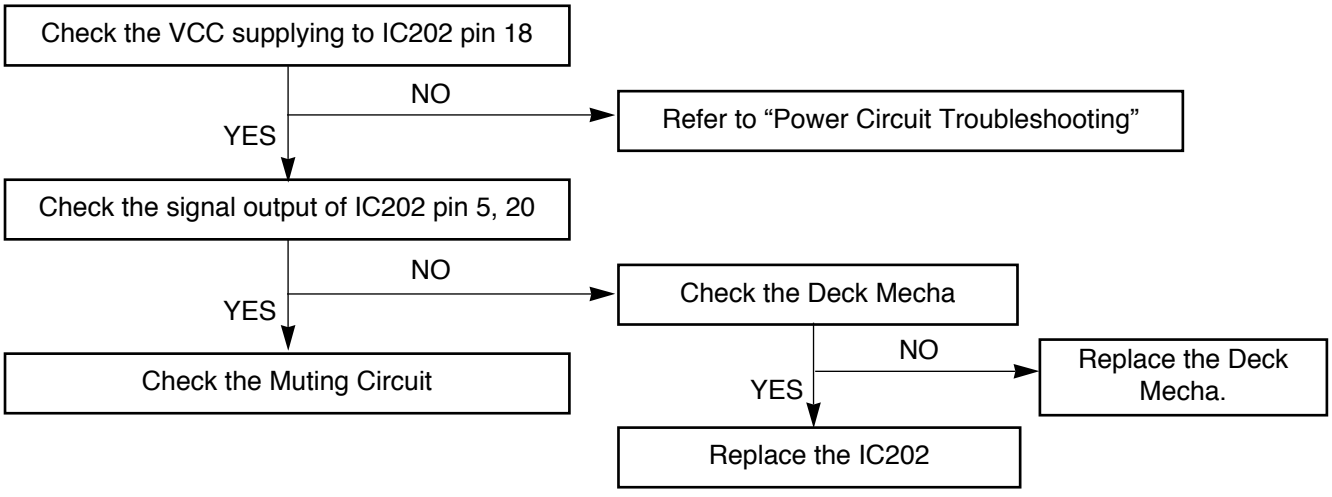
IC103 Troubleshooting



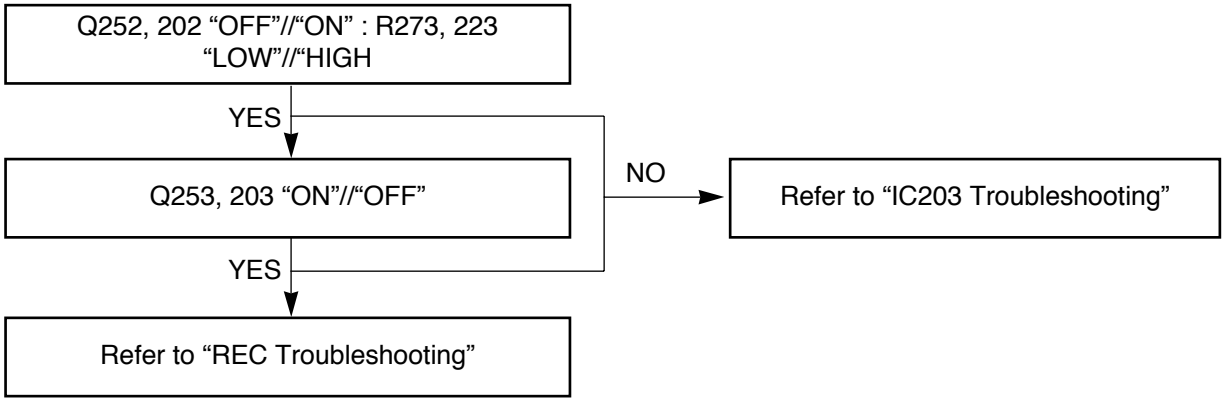
AM·COIL Troubleshooting



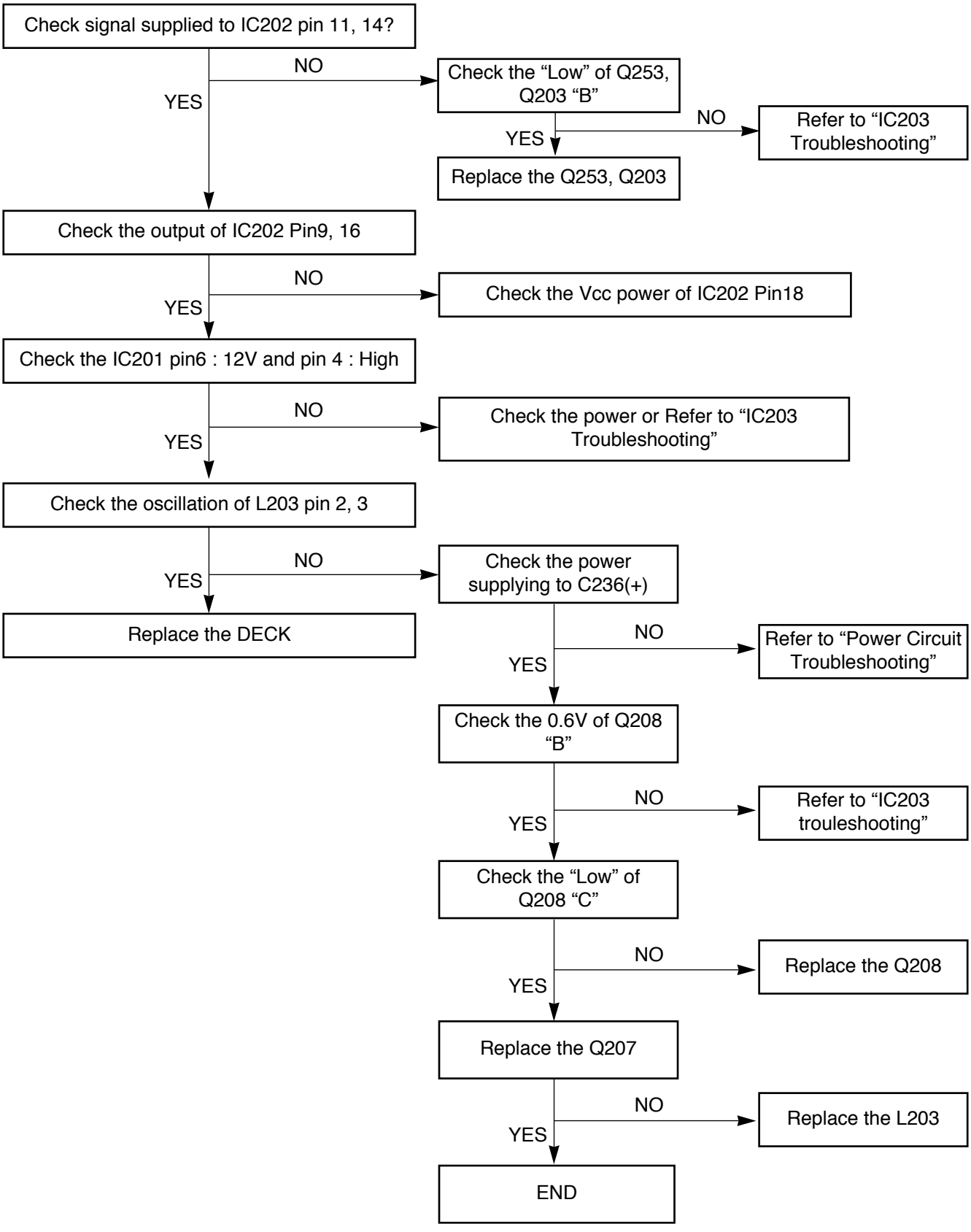
Play



Dubbing(“NORMAL or REC “//“HIGH”)



REC (Q252, Q202 ON / R273, R223 High)



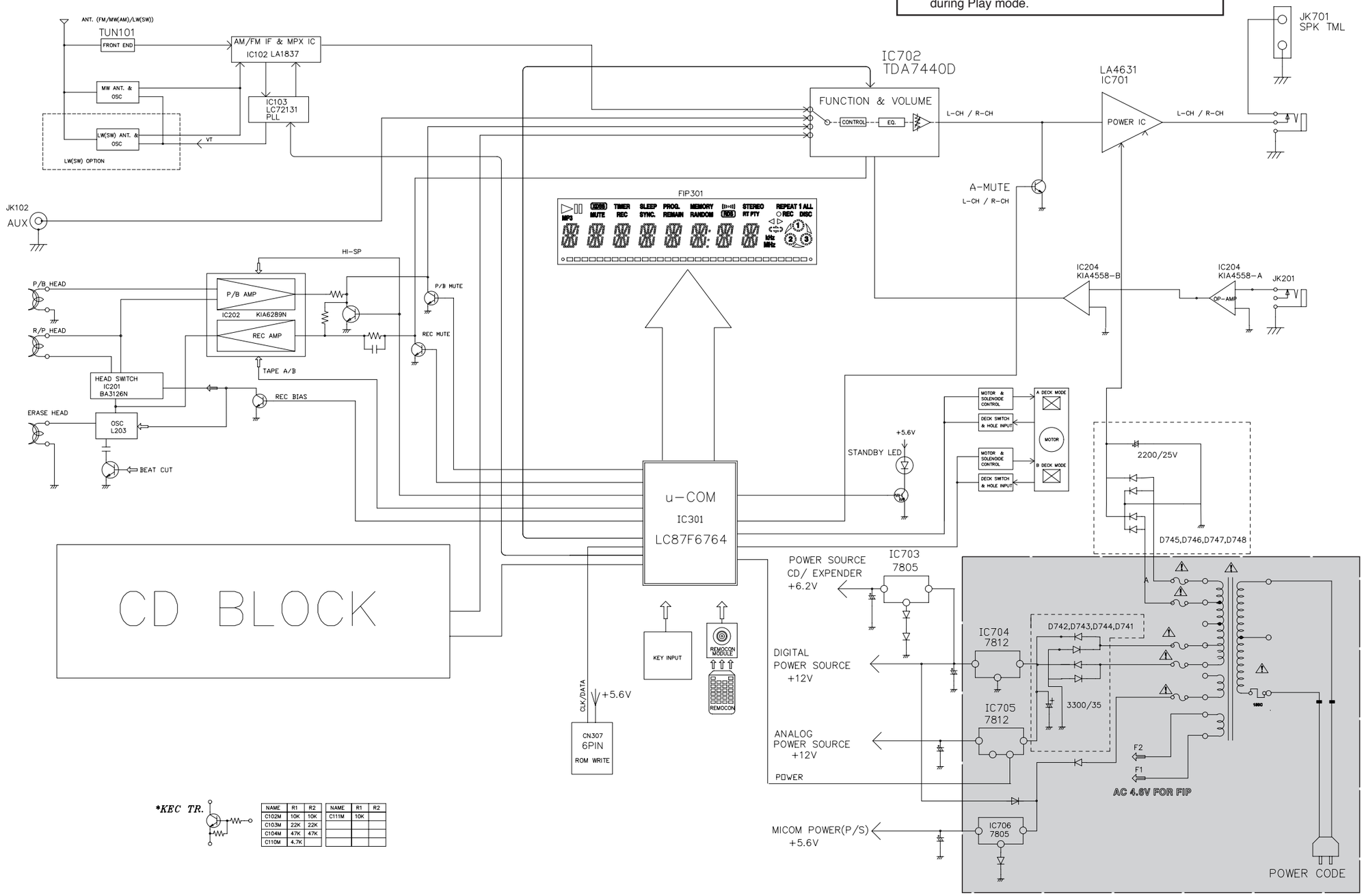
BLOCK DIAGRAM

NOTE: Warning

⚠ Parts that are shaded are critical With respect to risk of fire or electrical shock.

NOTE:

1. Shaded(■) parts are critical for safety.Replace only with specified part number.
2. Voltages are DC-measured with a digital voltmefer during Play mode.



*KEC TR.

NAME	R1	R2	NAME	R1	R2
C102M	10K	10K	C111M	10K	
C103M	22K	22K			
C104M	47K	47K			
C110M	4.7K				

BLOCK DIAGRAM
FFH-386/586

SCHEMATIC DIAGRAMS

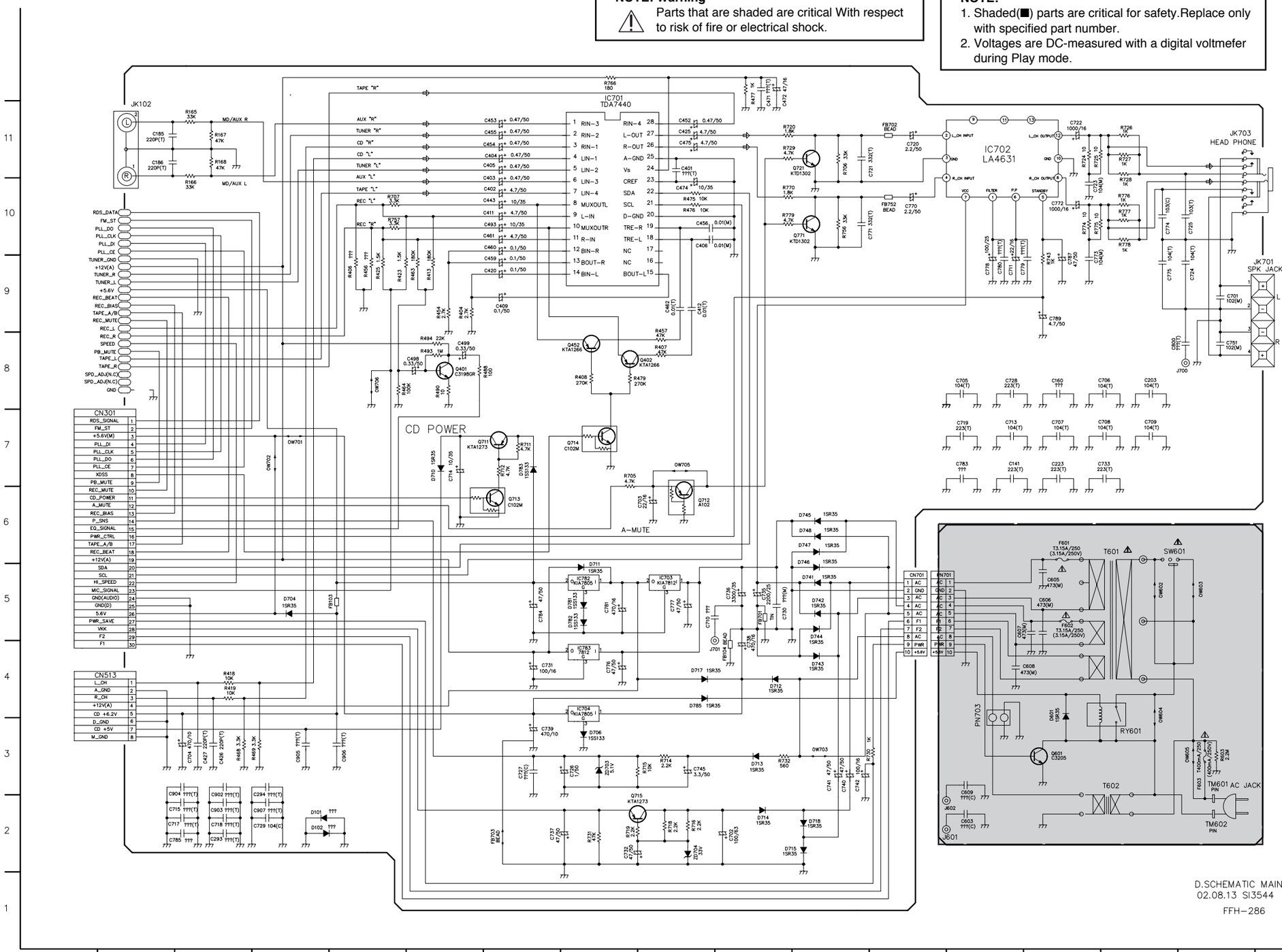
• MAIN SCHEMATIC DIAGRAM

NOTE: Warning

⚠ Parts that are shaded are critical With respect to risk of fire or electrical shock.

NOTE:

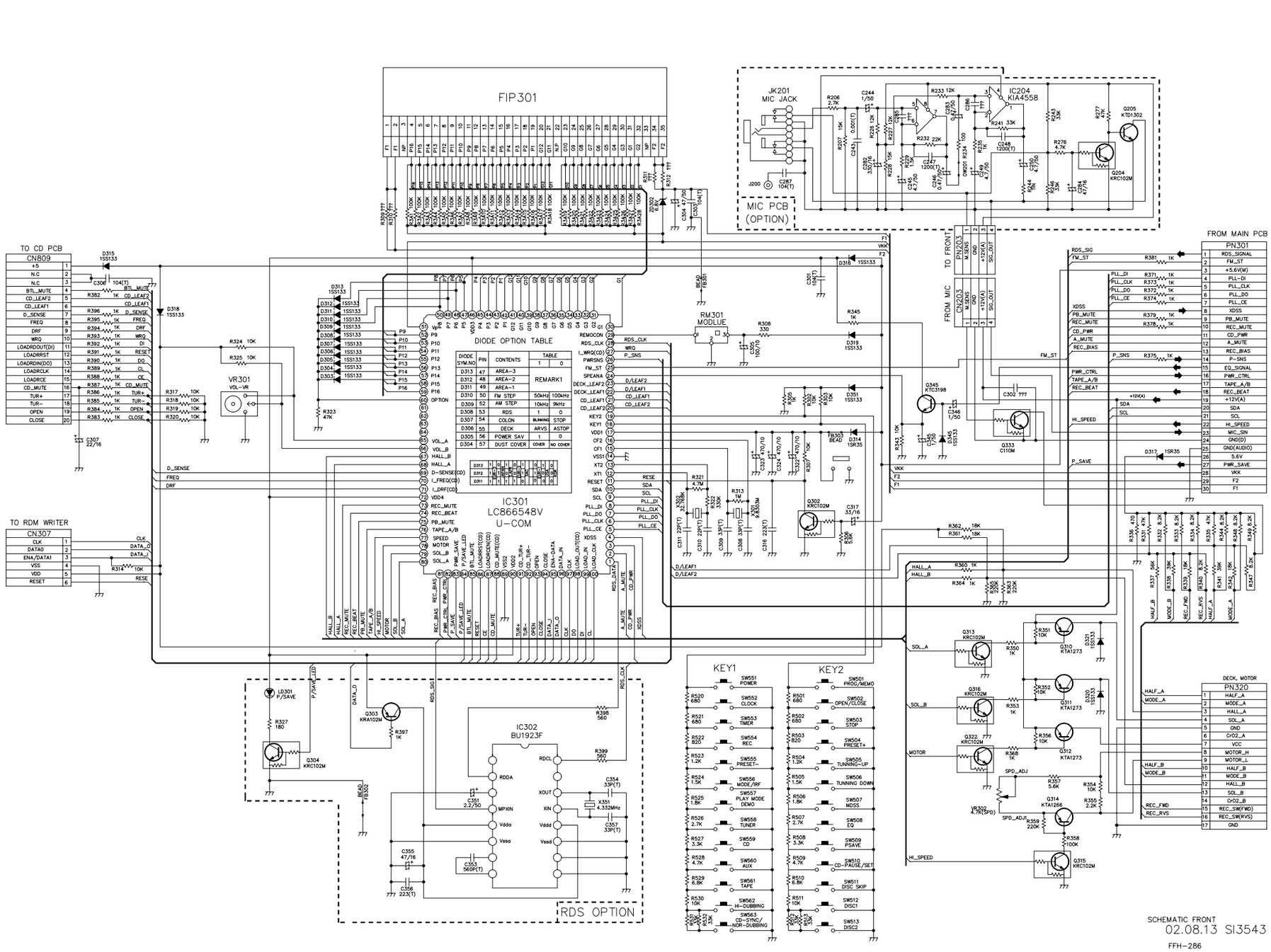
1. Shaded(■) parts are critical for safety.Replace only with specified part number.
2. Voltages are DC-measured with a digital voltmefer during Play mode.



LOCATION GUIDE

+12V(A)	A9	D102	D2	R725	N11
+5.6V	B9	D601	N3	R726	O11
AC JACK	P3	D704	D5	R727	O11
C141	M7	D706	H3	R728	O10
C160	N8	D710	F7	R729	J11
C185	B11	D711	H5	R730	L3
C186	B11	D712	J4	R731	H2
C203	O8	D713	J3	R732	J3
C223	N7	D714	J2	R743	N9
C293	C2	D715	J2	R756	K10
C294	D2	D717	I4	R757	E10
C401	I11	D718	K2	R766	H12
C402	G10	D741	K5	R770	J10
C403	G10	D742	K5	R774	N10
C404	G11	D743	K4	R775	N10
C405	G11	D744	K5	R776	O10
C406	I10	D745	K6	R777	O10
C409	G9	D746	K5	R778	O10
C411	G10	D747	K6	R779	J10
C412	I9	D748	K6	RDS_DATA	A10
C420	G9	D781	H5	REC_BEAT	A9
C425	I11	D782	H5	REC_BIAS	A9
C426	C3	D783	G7	REC_L	B9
C427	C3	D785	I4	REC_MUTE	A9
C443	G10	F601	N6	REC_R	B8
C452	I11	F602	N5	RY601	O3
C453	G11	F603	P3	SPEED	B8
C454	G11	FB103	E5	SW601	O6
C455	G11	FB104	J4	T601	O6
C456	I10	FB701	J5	T602	O3
C459	G9	FB702	L11	TAPE_A/B	A9
C460	G10	FB703	G2	TAPE_L	B8
C461	G10	FB752	L10	TAPE_R	B8
C462	I9	FM_ST	B10	TM601	P3
C471	J11	GND	B8	TM602	P2
C472	J11	IC701	H12	TUNER_GND	A9
C474	I10	IC702	M11	TUNER_L	A9
C475	I11	IC703	I5	TUNER_R	A9
C493	G10	IC704	H4	ZD703	H3
C498	F8	IC782	H5	ZD704	I2
C499	F8	IC783	H4		
C603	M2	J601	L2		
C605	N5	J602	L2		
C606	N5	J700	O8		
C607	M5	J701	I4		
C608	M4	JK102	B11		
C609	M3	JK701	P9		
C701	P9	JK703	P11		
C702	J2	OW602	O5		
C703	I6	OW603	P5		
C704	C3	OW604	O3		
C705	M8	OW605	P3		
C706	N8	OW701	D7		
C707	N7	OW702	D7		
C708	N7	OW703	K3		
C709	O7	OW705	I7		
C710	I5	OW706	E8		
C711	M9	PB_MUTE	A8		
C713	M7	PLL_CE	B10		
C714	F7	PLL_CLK	A10		
C715	B2	PLL_DI	B10		
C717	B2	PLL_DO	A10		
C718	C2	PN701	L5		
C719	M7	PN703	M3		
C720	L11	Q401	F8		
C721	L11	Q402	I8		
C722	N11	Q452	H8		
C723	N10	Q601	N3		
C724	P9	Q711	F7		
C725	P10	Q712	I6		
C726	H3	Q713	G6		
C727	G3	Q714	H7		
C728	M8	Q715	H2		
C729	D2	Q721	K11		
C730	J5	Q771	K10		
C731	O4	R165	C11		
C732	H2	R166	C10		
C733	N7	R167	C11		
C735	J5	R168	C11		
C736	J5	R404	F9		
C737	G2	R406	E9		
C738	J4	R407	I8		
C739	G3	R408	H8		
C740	K3	R413	F9		
C741	K3	R418	C4		
C742	K3	R419	C4		
C745	I3	R423	E9		
C751	P8	R425	E9		
C770	L10	R454	F9		
C771	L10	R456	E9		
C772	N10	R457	I8		
C773	N9	R463	F9		
C774	O10	R464	E8		
C775	O9	R468	C3		
C776	H4	R469	D3		
C777	I5	R475	I10		
C778	M9	R476	I10		
C779	N9	R477	J11		
C780	M9	R479	H8		
C781	H5	R488	G8		
C783	M7	R490	F8		
C784	G5	R493	F8		
C785	B2	R494	F8		
C787	N9	R603	P3		
C789	N9	R705	H7		
C800	O8	R706	K11		
C902	C2	R707	E10		
C903	C2	R711	G7		
C904	B2	R712	G7		
C905	D3	R714	I3		
C906	E3	R715	I3		
C907	D2	R716	I2		
CN301	A7	R718	I2		
CN513	A4	R719	H2		
CN701	L5	R720	J11		
D101	D2	R724	N11		

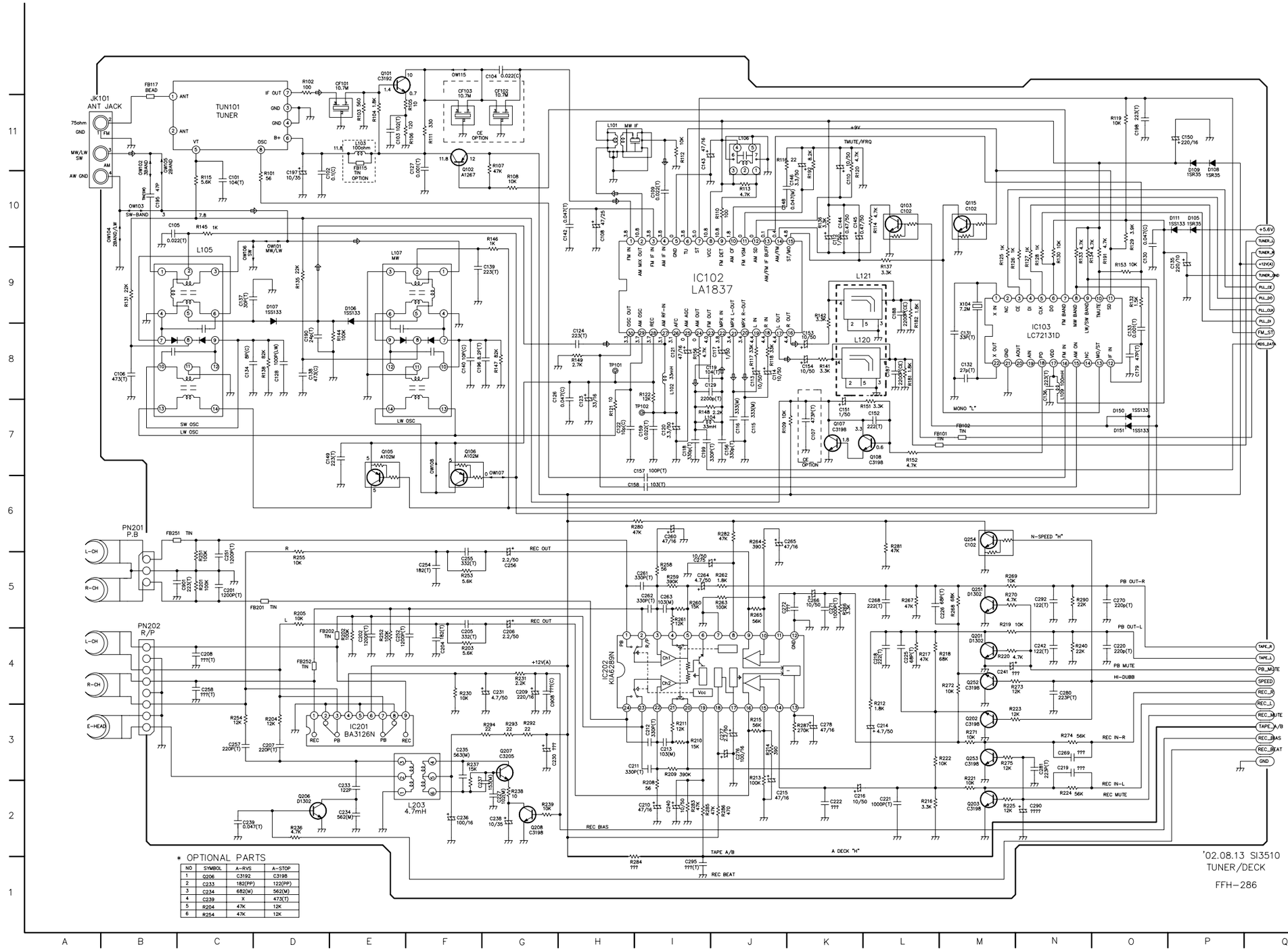
• FRONT SCHEMATIC DIAGRAM



LOCATION GUIDE

C243	L11	MODE_A	P5	R363	N5	SOL_B	F5
C244	L12	MODE_B	O3	R364	M6	SW501	L4
C245	L10	MODE_B	P5	R365	M5	SW502	L4
C246	M10	MOTOR	L3	R368	N3	SW503	L4
C247	M11	MOTOR	E5	R371	O9	SW504	L4
C248	M11	OPEN	H5	R372	O9	SW505	L3
C249	M11	OW201	M11	R373	O9	SW506	L3
C250	N11	PB_MUTE	F5	R374	O9	SW507	L3
C282	L11	PB_MUTE	N9	R375	O8	SW508	L3
C283	M11	PLL_CE	I6	R378	O9	SW509	L2
C284	O10	PLL_CE	O9	R379	O9	SW510	L2
C285	L11	PLL_CLK	I6	R381	O10	SW511	L2
C286	M11	PLL_CLK	O9	R382	B9	SW512	L2
C287	K10	PLL_DI	I7	R383	B8	SW513	L1
C301	K9	PLL_DI	O9	R384	B8	SW551	J4
C302	N8	PLL_DO	I6	R385	B8	SW552	J4
C303	J10	PLL_DO	O9	R386	B8	SW553	J4
C304	J10	PN203	M10	R387	B8	SW554	J4
C305	J8	PN301	P10	R388	B8	SW555	J3
C306	B9	PN320	P4	R389	B8	SW556	J3
C307	B7	PWR_CTRL	F5	R390	B8	SW557	J3
C308	J6	PWR_CTRL	N8	R391	B8	SW558	J3
C309	J6	P_SAVE	O5	R392	B8	SW559	J2
C310	J6	P_SAVE	N7	R393	B9	SW560	J2
C311	J6	P_SNS	O8	R394	B9	SW561	J2
C316	K6	P_SNS	I8	R395	B9	SW562	J2
C317	L6	Q204	O11	R396	B9	SW563	J1
C322	K7	Q205	O11	R397	F4	TAPE_A/B	F5
C323	K7	Q302	K7	R398	I4	TAPE_A/B	N8
C324	K7	Q303	F4	R399	I3	TUR+	H5
C345	M7	Q304	E3	R3A1	F10	TUR+	C8
C346	M8	Q310	N5	R3A10	G10	TUR−	C8
C351	G3	Q311	N4	R3A11	G10	TUR−	H5
C353	G2	Q312	N3	R3A12	G10	VKK	L7
C354	I3	Q313	M5	R3A13	G10	VKK	L10
C355	F2	Q314	N3	R3A14	H10	VR301	D8
C356	F2	Q315	N2	R3A15	H10	VR302	M3
C357	I3	Q316	M4	R3A16	H10	WRQ	C9
CD_MUTE	C8	Q322	M4	R3A17	H10	WRQ	I8
CD_MUTE	D5	Q333	N7	R3A18	H10	X301	J6
CD_PWR	I5	Q345	M8	R3A19	H10	X302	J6
CD_PWR	N9	R206	K12	R3A2	F10	X351	I3
CE	C8	R207	L11	R3A20	H10	XDSS	I5
CE	G5	R226	L11	R3A21	H10	XDSS	N9
CL	C8	R227	L11	R3A22	H10	ZD302	I10
CL	H5	R228	L11	R3A23	I10		
CLK	C6	R229	L11	R3A24	I10		
CLK	H5	R232	L11	R3A25	I10		
CLOSE	C8	R233	M12	R3A26	I10		
CLOSE	H5	R234	M11	R3A27	I10		
CN203	M9	R235	M11	R3A28	I10		
CN307	B6	R241	M11	R3A3	F10		
CN809	B10	R243	N11	R3A4	G10		
D/LEAF1	J6	R244	N10	R3A5	G10		
D/LEAF1	I8	R246	N10	R3A6	G10		
D/LEAF2	J6	R276	N11	R3A7	G10		
D/LEAF2	I8	R277	O11	R3A8	G10		
D303	E8	R302	K8	R3A9	G10		
D304	E8	R303	K8	R501	K4		
D305	E8	R305	K8	R502	K4		
D306	E8	R306	L6	R503	K4		
D307	E8	R307	K7	R504	K3		
D308	E9	R308	K9	R505	K3		
D309	E9	R309	F10	R506	K3		
D310	E9	R310	F10	R507	K3		
D311	E9	R311	I10	R508	K2		
D312	E9	R312	I10	R509	K2		
D313	E9	R313	J7	R510	K2		
D314	L7	R314	C6	R511	K2		
D315	B10	R317	C8	R512	K1		
D316	L9	R318	C8	R513	K1		
D317	O7	R319	C8	R520	J4		
D318	C9	R320	C8	R521	J4		
D319	L8	R321	J7	R522	J4		
D320	O4	R322	J6	R523	J3		
D321	O5	R323	E8	R524	J3		
D345	M7	R324	D9	R525	J3		
D351	L8	R325	D8	R526	J3		
DATA_I	C6	R327	E4	R527	J2		
DATA_I	H5	R331	O6	R528	J2		
DATA_O	C6	R332	O6	R529	J2		
DATA_O	H5	R333	P6	R530	J2		
DATA_O	F4	R334	P6	R531	J1		
DI	C8	R335	P6	R532	J1		
DI	H5	R336	O6	RDS_CLK	I4		
DO	C8	R337	O5	RDS_CLK	I9		
DO	H5	R338	P5	RDS_SIG	N10		
DRF	C7	R339	P5	RDS_SIG	G4		
DRF	C9	R340	P5	REC_BEAT	E5		
D_SENSE	C7	R341	P5	REC_BEAT	I8		
D_SENSE	C9	R342	P5	REC_BIAS	E5		
F1	L7	R343	L7	REC_BIAS	I8		
F1	L10	R344	P6	REC_FWD	D3		
F2	L10	R345	L9	REC_FWD	P5		
F2	L7	R347	Q5	REC_MUTE	E5		
FB301	J9	R348	P6	REC_MUTE	I9		
FB302	F3	R349	Q6	REC_RVS	D3		
FB303	K7	R350	N5	REC_RVS	P5		
FIP301	G11	R351	N5	RESE	C6		
FM_ST	N8	R352	N4	RESE	I7		
FM_ST	N10	R353	N4	RESET	C8		
FREQ	C7	R354	O3	RESET	G5		
FREQ	C9	R355	O3	RM301	J9		
IC204	N12	R356	N4	SCL	O8		
IC301	G7	R357	N3	SCL	I7		
IC302	H4	R358	N2	SDA	I7		
J200	J10	R359	N3	SDA	O8		
JK201	K12	R360	M6	SOL_A	F5		
LD301	E4	R361	M6	SOL_A	L5		
MODE_A	O4	R362	M6	SOL_B	L4		

• TUNER/DECK SCHEMATIC DIAGRAM



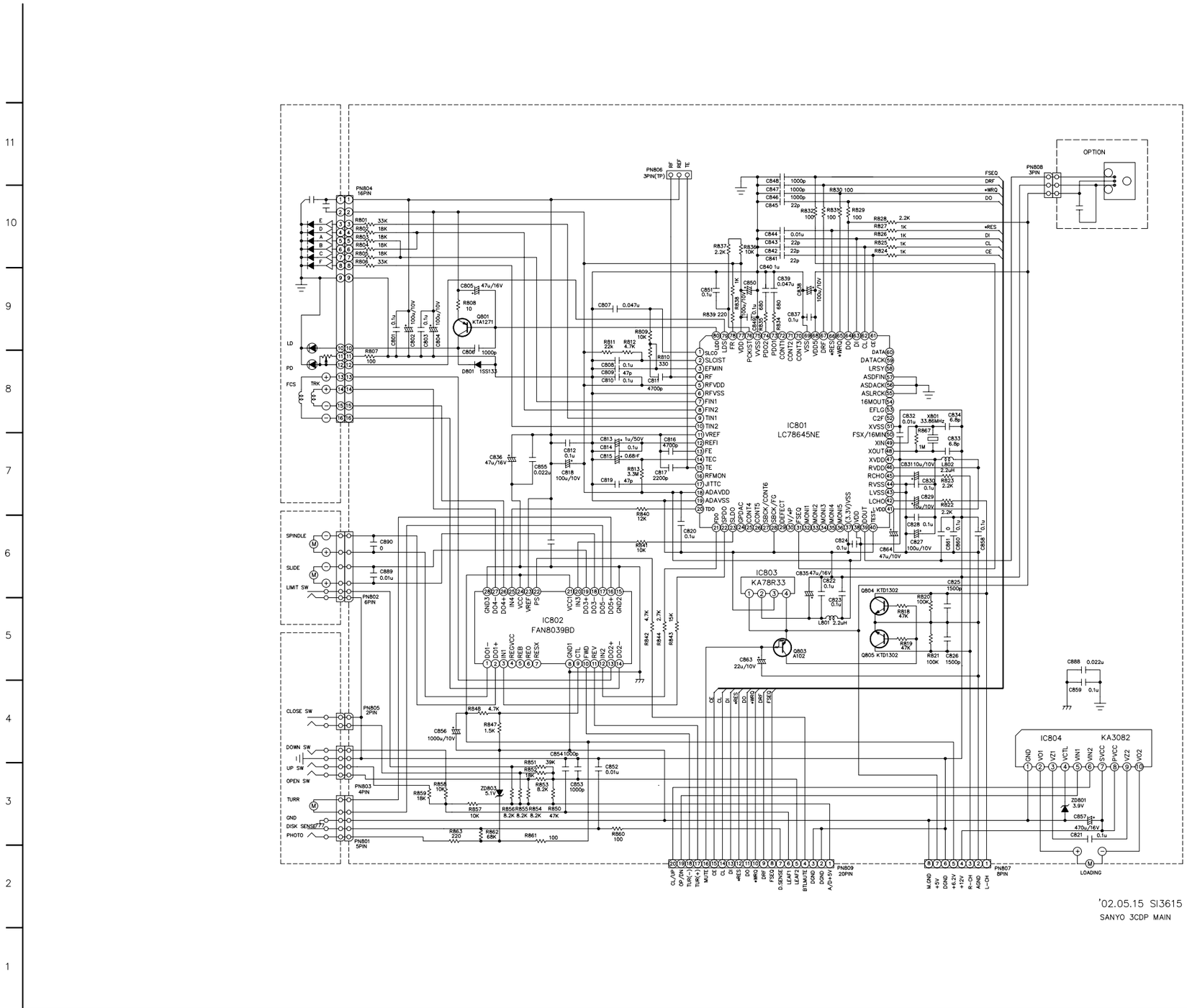
* OPTIONAL PARTS

NO	SYMBOL	A-RVS	A-STOP
1	Q206	C3192	C3198
2	C233	182(PP)	122(PP)
3	C234	682(M)	562(M)
4	C239	X	473(T)
5	R204	47K	12K
6	R254	47K	12K

LOCATION GUIDE

C101	C10	C270	O5	R132	O9
C102	E10	C271	K5	R133	N9
C103	E11	C272	J5	R134	O9
C104	G12	C275	I5	R135	D9
C105	B10	C276	J3	R136	K10
C106	B8	C277	J3	R137	L9
C107	K7	C278	K3	R138	D8
C108	H10	C280	N4	R141	K8
C109	I10	C281	N3	R142	K9
C110	K10	C290	N2	R144	E8
C112	K10	C292	N5	R145	C10
C113	J6	C295	I1	R146	G10
C114	J8	C901	C5	R147	G8
C115	J7	C908	G3	R148	I7
C116	J7	CF101	E12	R149	H8
C117	J6	CF102	G12	R151	K7
C118	I7	CF103	F12	R152	L7
C119	I8	D105	P10	R153	O9
C120	I7	D106	E9	R156	I8
C121	I8	D107	D9	R181	L8
C122	H7	D108	P10	R182	L8
C123	H7	D109	P10	R191	O9
C124	H8	D111	P10	R192	K10
C126	G7	D150	O7	R201	C5
C127	F10	D151	O7	R202	E4
C128	D8	FB101	L7	R203	F4
C129	I6	FB102	M7	R204	O3
C130	O9	FB115	E11	R205	D5
C131	M8	FB117	B12	R208	I2
C132	M8	FB201	C5	R209	I3
C133	O8	FB202	D4	R210	I3
C134	C8	FB251	B6	R211	I3
C135	P9	FB252	D4	R212	L3
C136	N7			R213	J3
C137	C9	GND	Q3	R214	J3
C138	D8	IC102	I9	R215	J3
C139	G9	IC103	N8	R216	L2
C140	F8	IC201	E3	R217	L4
C142	H10	IC202	H4	R218	M4
C143	I11	JK101	A11	R219	M5
C144	K10	L101	H11	R220	M4
C145	K10	L102	I8	R221	M3
C146	K10	L103	E11	R222	M3
C148	J10	L104	I7	R223	M3
C149	D7	L105	C9	R224	N2
C150	P11	L106	J11	R225	M2
C151	K7	L107	E9	R230	F4
C152	L7	L109	N8	R231	G4
C153	K8	L120	K8	R236	D2
C154	K8	L121	K9	R237	F3
C156	J7	L203	F2	R238	G2
C157	H7	OW101	D9	R239	G2
C158	H6	OW102	B10	R240	N4
C159	I7	OW103	B10	R251	C5
C179	O8	OW104	B10	R252	E4
C187	L8	OW105	B10	R253	F5
C188	L9	OW106	C9	R254	C3
C190	D8	OW107	G7	R255	D5
C195	B10	OW108	F7	R258	I5
C196	F8	OW115	F12	R259	I5
C197	D10	PB_MUTE	Q4	R260	I5
C198	O11	PLL_CE	Q9	R261	I5
C199	I7	PLL_CLK	Q9	R262	J5
C201	C5	PLL_DI	Q9	R263	J5
C202	E4	PLL_DO	Q9	R264	J6
C204	F4	PN201	B6	R265	J5
C205	F4	PN202	B4	R266	K5
C206	G4	Q101	E12	R267	L5
C207	D3	Q102	F10	R268	M5
C208	C4	Q103	L10	R269	M5
C209	G4	Q105	E7	R270	M5
C210	I2	Q106	F7	R271	M3
C211	H3	Q107	K7	R272	M4
C212	I3	Q108	L7	R273	M4
C213	I3	Q115	M10	R274	N3
C214	L3	Q201	M4	R275	M3
C215	J2	Q202	M3	R280	H6
C216	K2	Q203	M2	R281	L6
C218	L4	Q206	D2	R282	J6
C219	N3	Q207	G3	R283	I2
C220	O4	Q208	G2	R284	H1
C221	L2	Q251	M5	R285	I2
C222	K2	Q252	M4	R286	J2
C225	L4	Q253	M3	R287	K3
C226	M5	Q254	M6	R290	N5
C227	G2	R101	D10	R292	G3
C230	G3	R102	D12	R293	G3
C231	G4	R103	E11	R294	G3
C233	E2	R104	E11	RDS_DATA	I8
C234	E2	R105	F11	REC_BEAT	I3
C235	F3	R106	F11	REC_BIAS	I3
C236	F2	R107	G11	REC_L	Q3
C237	F2	R108	G10	REC_MUTE	I3
C238	G2	R109	J7	REC_R	Q4
C239	C2	R110	J10	SPEED	Q4
C240	I2	R111	F11	TAPE_A/B	I3
C241	M4	R112	I11	TAPE_L	Q4
C242	N4	R113	J10	TAPE_R	Q4
C251	C5	R114	L10	TP101	H8
C252	E4	R115	C10	TP102	I7
C254	F5	R116	J11	TUN101	C11
C255	F5	R117	J8	TUNER_GND	
C256	G5	R118	J8	TUNER_LO	L10
C257	C3	R119	O11	TUNER_RO	I9
C258	C4	R120	K10	X104	M9
C260	I6	R121	H7		
C261	I5	R122	I8		
C262	I5	R125	M9		
C263	I5	R126	M9		
C264	I5	R127	N9		
C265	J6	R128	N9		
C266	K5	R129	O9		
C268	L5	R130	N9		
C269	N3	R131	B9		

• CDP SCHEMATIC DIAGRAM



LOCATION GUIDE

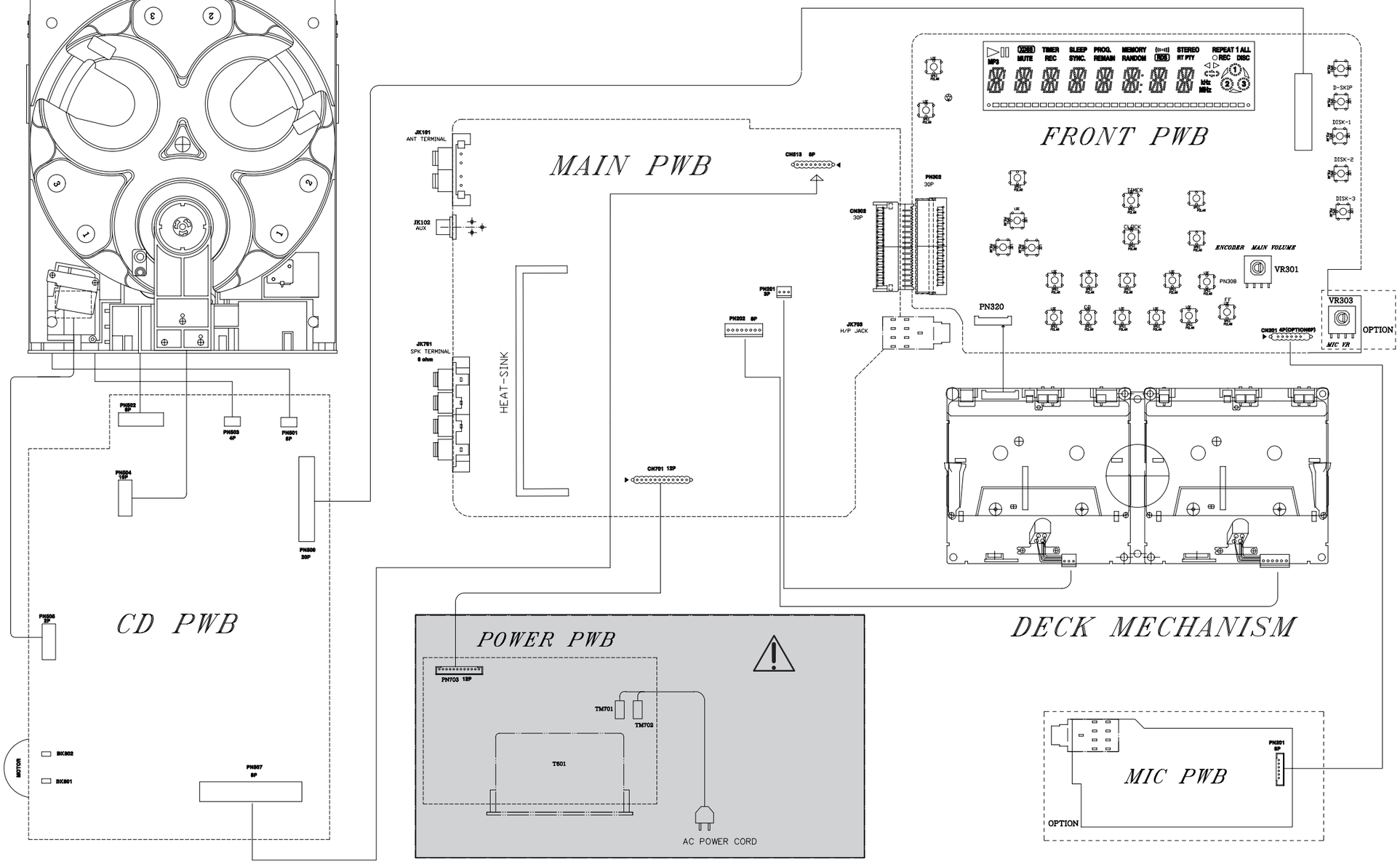
•RES	L10	R819	K5
•RES	I4	R820	L5
•WRQ	L10	R821	L5
•WRQ	J4	R822	L7
C801	E9	R823	L7
C802	E9	R824	K10
C803	F9	R825	K10
C804	F9	R826	K10
C805	F9	R827	K10
C806	F8	R828	K10
C807	H9	R829	K10
C808	H8	R830	J10
C809	H8	R831	J10
C810	H8	R832	J10
C811	H8	R834	J9
C812	G7	R835	J9
C813	H7	R836	I10
C814	H7	R837	I10
C815	H7	R838	I9
C816	H7	R839	I9
C817	H7	R840	H6
C818	G7	R841	H6
C819	H7	R842	H5
C820	I6	R843	I5
C821	M3	R844	H5
C822	J6	R847	F4
C823	J5	R848	F4
C824	K6	R850	G3
C825	L6	R851	G3
C826	L5	R852	G3
C827	K6	R853	G3
C828	K6	R854	G3
C829	L7	R855	G3
C830	L7	R856	G3
C831	K7	R857	F3
C832	K8	R858	F3
C833	L7	R859	E3
C834	L8	R860	H3
C835	J6	R861	G3
C836	F7	R862	F3
C837	J9	R863	F3
C838	J9	R867	L8
C839	J9	X801	L8
C840	J9	ZD801	M3
C841	J10	ZD803	F3
C842	J10		
C843	J10		
C844	J10		
C845	J10		
C846	J10		
C847	J10		
C848	J11		
C849	J9		
C850	I9		
C851	I9		
C852	H3		
C853	G3		
C854	G4		
C855	G7		
C856	F4		
C857	M3		
C858	L6		
C859	M4		
C860	L6		
C861	L6		
C863	I5		
C864	K6		
C888	M5		
C889	E6		
C890	E6		
CE	L10		
CE	I4		
CL	L10		
CL	I4		
D801	F8		
DI	L10		
DI	I4		
DO	L10		
DO	I4		
DRF	L11		
DRF	J4		
FSEQ	L11		
FSEQ	J4		
IC801	J8		
IC802	G5		
IC803	J6		
IC804	M4		
L801	J5		
L802	L7		
PN801	E3		
PN802	E5		
PN803	E3		
PN804	E10		
PN805	E4		
PN806	H11		
PN807	L2		
PN808	M11		
PN809	K2		
Q801	F9		
Q803	J5		
Q804	K6		
Q805	K5		
R801	E10		
R802	E10		
R803	E10		
R804	E10		
R805	E10		
R806	E10		
R807	E8		
R808	F9		
R809	H9		
R810	H8		
R811	H9		
R812	H9		
R813	H7		
R818	K5		

WIRING DIAGRAM

NOTE: Warning
⚠ Parts that are shaded are critical With respect to risk of fire or electrical shock.

3CD CHANGER MECHANISM ASSY

FFH-286 WIRING DIAGRAM



*KEC TR.

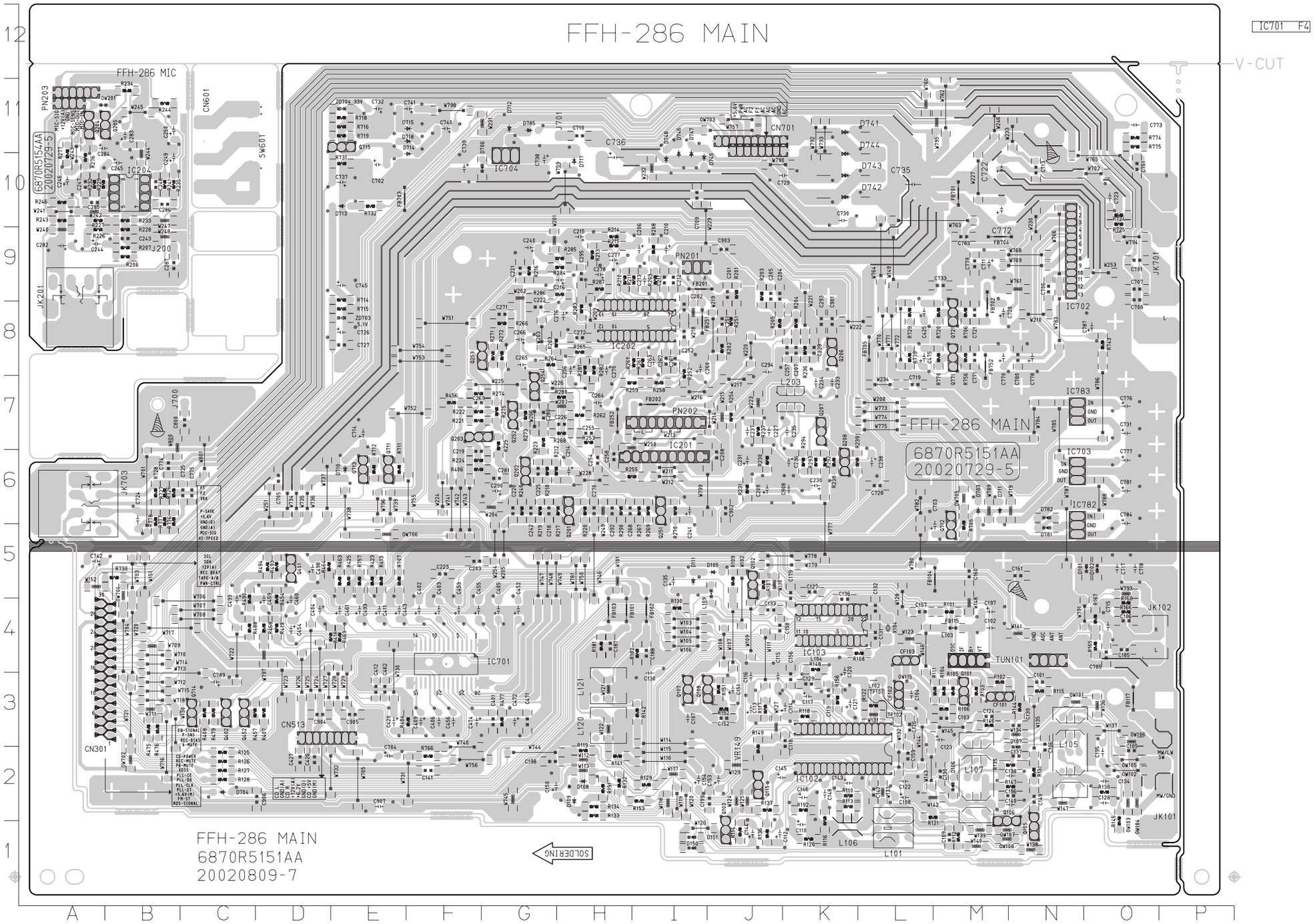
NAME	R1	R2
C102M	10K	10K
C103M	22K	22K
C104M	47K	47K
C110M	4.7K	

NAME	R1	R2
C111M	10K	

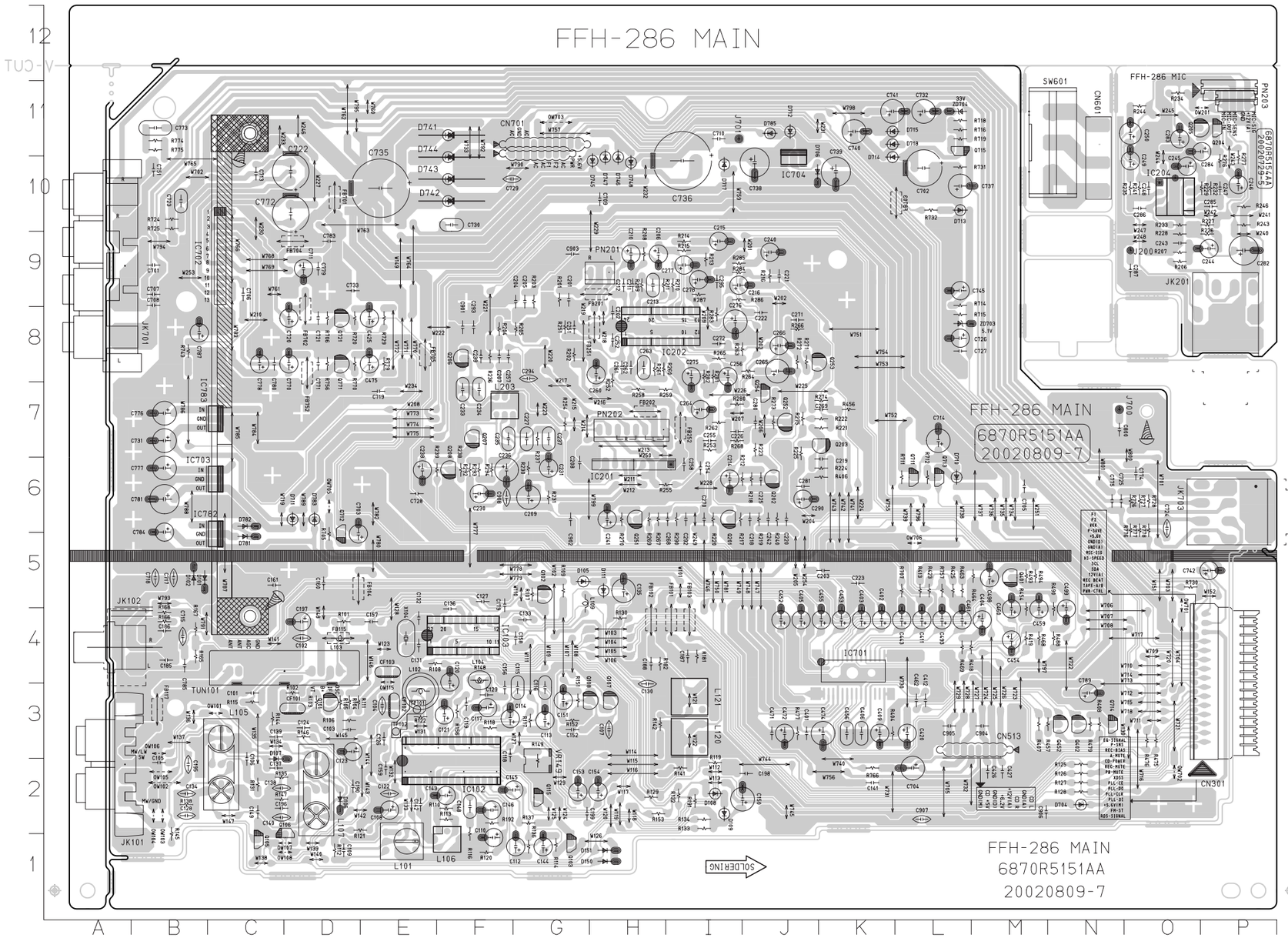
SCHEMATIC DIAGRAM
FFH-286 WIRING DIAGRAM

PRINTED CIRCUIT DIAGRAMS

• MAIN P.C. BOARD (SOLDER SIDE)

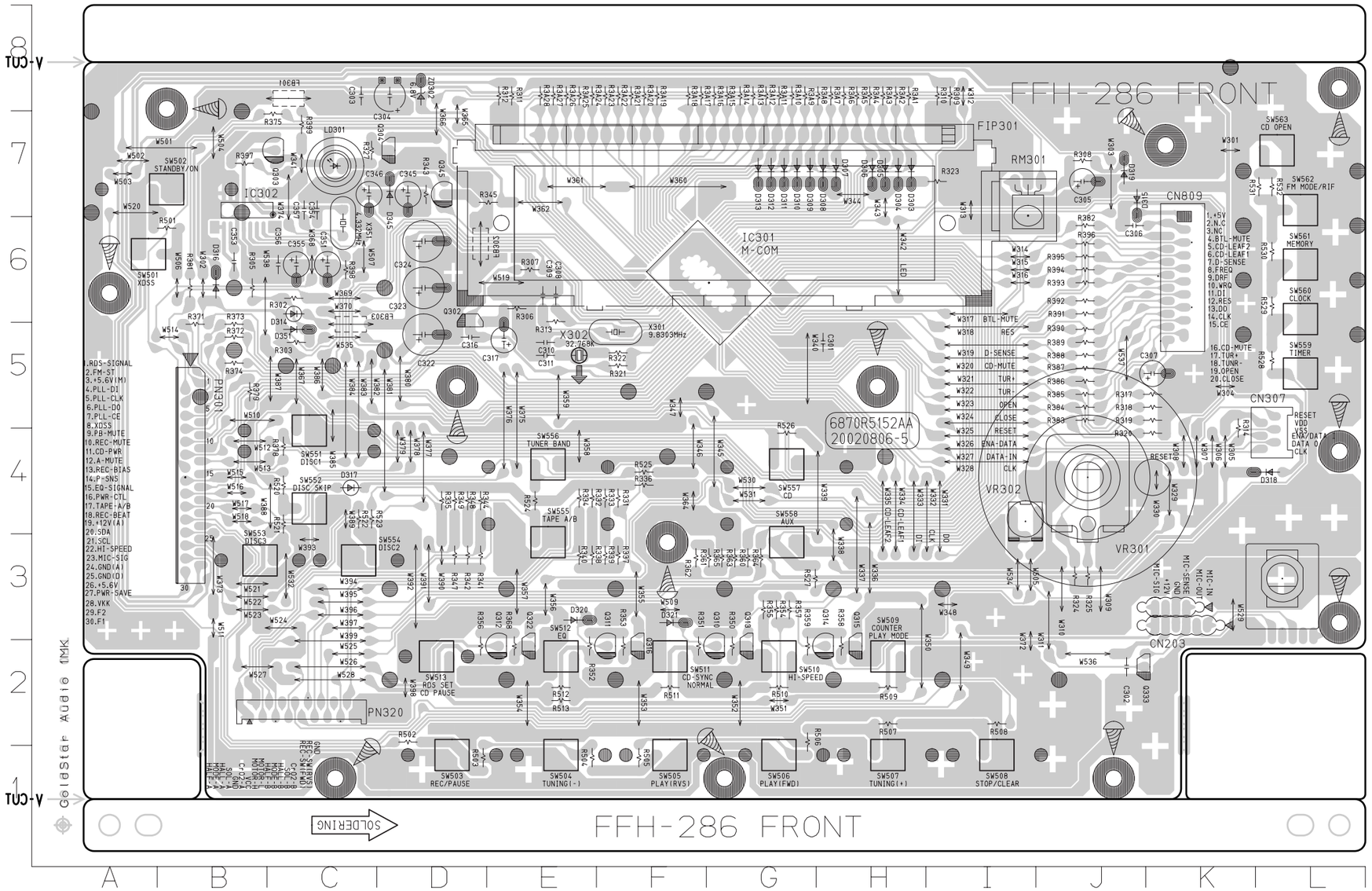


• MAIN P.C. BOARD (COMPONENT SIDE)



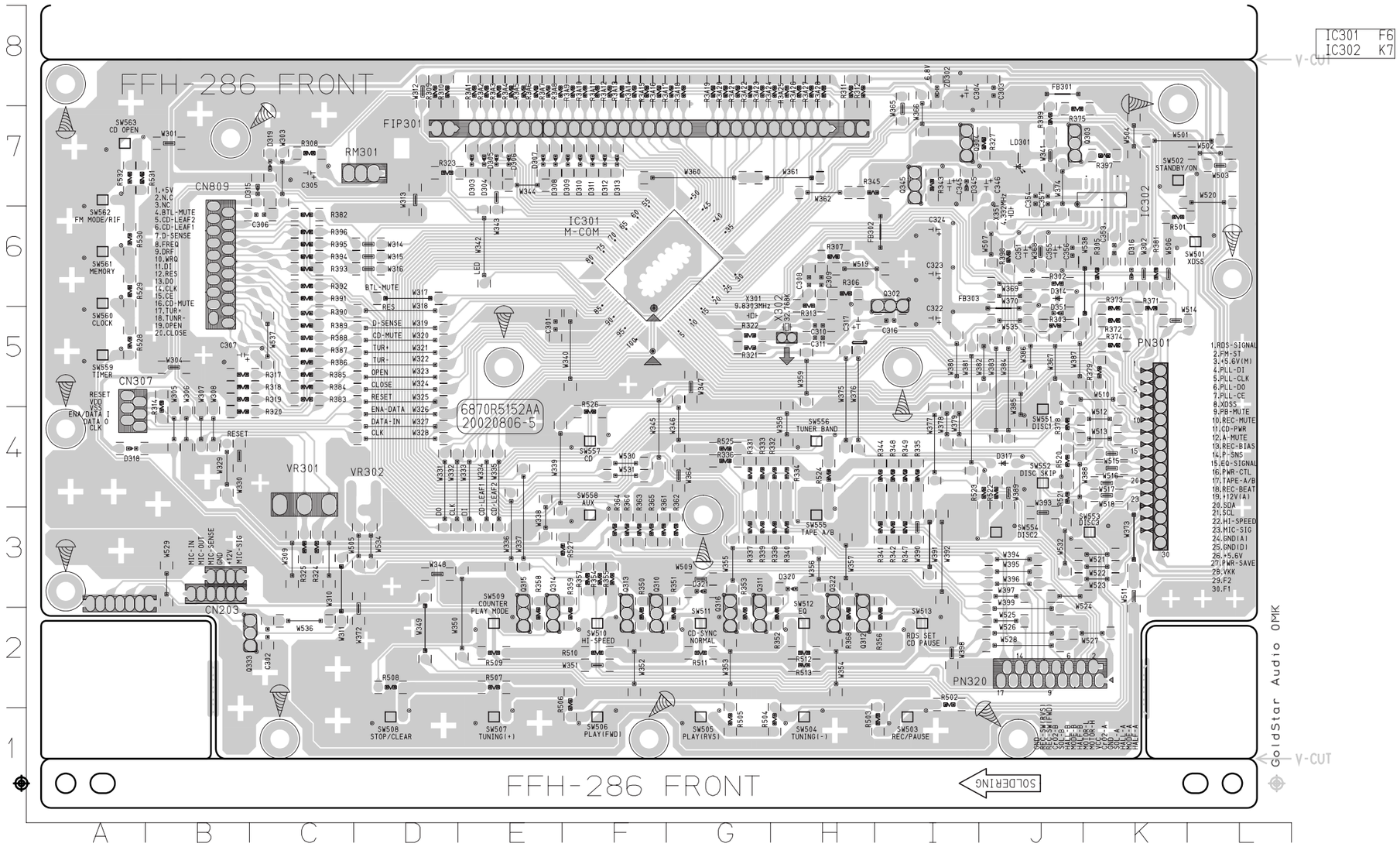
C101	C3	C206	H9	C293	F8	C751	B10	FB202	H7	Q252	J7	R205	G8	R290	I6
C102	D4	C207	F8	C294	G8	C770	D8	FB251	H8	Q253	J8	R206	O9	R292	F6
C103	D3	C208	G6	C295	I9	C771	D8	FB252	I7	Q254	J7	R207	O9	R293	F6
C104	E3	C209	G6	C401	J3	C772	D10	FB701	D10	Q401	M5	R208	H9	R294	F6
C105	B2	C210	H9	C402	K4	C773	B11	FB702	D8	Q402	N3	R209	H9	R404	K3
C106	C2	C211	H9	C403	K4	C774	O6	FB703	L10	Q452	N3	R210	I9	R406	K6
C107	H3	C212	H9	C404	M4	C775	N6	FB704	D9	Q711	L6	R211	H9	R407	M3
C108	E2	C213	H9	C405	J4	C776	B7	FB705	E8	Q712	D5	R212	J6	R408	N3
C109	D1	C214	I6	C406	K3	C777	B6	FB752	D8	Q713	L6	R213	I9	R413	L5
C110	F1	C215	I9	C409	K3	C778	C8	IC102	E2	Q714	N3	R214	I9	R418	M4
C112	G1	C216	I9	C411	L4	C779	D9	IC103	E4	Q715	L1	R215	I9	R419	M4
C113	G3	C218	J6	C412	L3	C780	C8	IC201	I6	Q721	D8	R216	J9	R423	L5
C114	F3	C219	K6	C420	L3	C781	B6	IC202	H8	Q771	D8	R217	I6	R425	L5
C115	G3	C220	J6	C425	E8	C783	D9	IC204	O10	R101	D4	R218	J6	R454	M4
C116	G3	C221	J9	C426	M2	C784	B5	IC702	C10	R102	D3	R219	J6	R456	K7
C117	F3	C222	J8	C427	M2	C785	B4	IC703	C6	R103	D3	R220	I6	R457	N3
C118	F3	C223	K5	C443	L4	C787	B8	IC704	J10	R104	D3	R221	K7	R463	L5
C119	F3	C225	J6	C452	J4	C789	N3	IC782	C5	R105	D3	R222	K7	R464	M5
C120	F4	C226	I7	C453	K4	C800	N7	IC783	C7	R106	D3	R223	J7	R468	M4
C121	F3	C227	G7	C454	M4	C901	F8	J200	O9	R107	G5	R224	K6	R469	L4
C122	E2	C230	F6	C455	K4	C902	G6	J700	N7	R108	E4	R225	J7	R475	O3
C123	D3	C231	G6	C456	K3	C903	G9	J701	I11	R109	G5	R226	P9	R476	O3
C124	D3	C233	F7	C459	M4	C904	M3	JK101	A2	R110	F2	R227	P10	R477	J3
C126	E3	C234	F7	C460	M4	C905	L3	JK102	A4	R111	D3	R228	O9	R479	N3
C127	F5	C235	F7	C461	L4	C906	M2	JK201	P8	R112	D1	R229	P10	R488	N4
C128	B2	C236	F6	C462	L3	C907	L2	JK701	A9	R113	F2	R230	G6	R490	N4
C129	F3	C237	G7	C471	J3	C908	F6	JK703	P6	R114	G1	R231	G6	R493	M5
C130	H3	C238	E6	C472	J3	CF101	D3	L101	E1	R115	C3	R232	P10	R494	M5
C131	E4	C239	F8	C474	K3	CF102	E3	L102	E3	R116	F1	R233	O10	R705	D5
C132	E4	C240	J9	C475	E8	CF103	E4	L103	D4	R117	G3	R234	O1	R706	D8
C133	G4	C241	H6	C493	L4	CN301	P3	L104	F4	R118	F3	R235	O10	R707	L5
C134	B2	C242	J6	C498	M5	CN513	M3	L105	C2	R119	I2	R236	F8	R711	L6
C135	H5	C243	O9	C499	N4	CN601	N10	L106	E1	R120	F1	R237	G7	R712	L6
C136	F4	C244	P9	C701	B9	CN701	F11	L107	D2	R121	E2	R238	F6	R714	L9
C137	C2	C245	O10	C702	L10	D101	B5	L109	G5	R122	E3	R239	F6	R715	L8
C138	C2	C246	P10	C703	D5	D102	B5	L120	I3	R125	N2	R240	J6	R716	L1
C139	C3	C247	P10	C704	L2	D105	G5	L121	I3	R126	N2	R241	O10	R718	L1
C140	C2	C248	O10	C705	M6	D106	D2	L203	F7	R127	N2	R243	P10	R719	L1
C141	K2	C249	O10	C706	C9	D107	C2	OW101	C3	R128	N2	R244	O1	R720	D8
C142	E2	C250	O11	C707	B9	D108	I2	OW102	B2	R129	H2	R246	P10	R724	B10
C143	F2	C251	G8	C708	B9	D109	I2	OW103	B2	R130	H4	R251	G8	R725	B10
C144	G1	C252	H8	C709	H10	D111	H5	OW104	B2	R131	C2	R252	H8	R726	O6
C145	G2	C254	I6	C710	I11	D150	H1	OW105	B2	R132	I2	R253	I7	R727	O6
C146	F2	C255	I7	C711	D9	D151	H1	OW106	B3	R133	I2	R254	G7	R728	O6
C148	F2	C256	I8	C713	C10	D704	N2	OW107	D1	R134	I2	R255	I6	R729	E8
C149	C2	C257	F8	C714	L7	D706	J10	OW108	D1	R135	C2	R258	H7	R730	O5
C150	J2	C258	I6	C715	B4	D710	L6	OW115	E4	R136	G1	R259	I7	R731	L10
C151	G3	C260	H8	C717	B5	D711	D6	OW201	P11	R137	G2	R260	H8	R732	L10
C152	G3	C261	H8	C718	B5	D712	J11	OW701	O5	R138	B2	R261	H8	R743	B8
C153	G2	C262	H8	C719	E7	D713	L10	OW702	O2	R141	I2	R262	I7	R756	D8
C154	H2	C263	H8	C720	D8	D714	K10	OW703	G1	R142	H3	R263	J8	R757	L5
C156	F3	C264	I7	C721	D8	D715	K11	OW705	D6	R144	C3	R264	J8	R766	K2
C157	E4	C265	J8	C722	D10	D717	I10	OW706	L5	R145	B1	R265	I8	R770	D8
C158	G4	C266	J8	C723	B10	D718	K11	PN201	H9	R146	D3	R266	J8	R774	B1
C159	E2	C268	I6	C724	O6	D741	F11	PN202	H7	R147	C2	R267	H6	R775	B1
C160	D5	C269	K7	C725	N6	D742	F10	PN203	P11	R148	F4	R268	I7	R776	O6
C161	C5	C270	I6	C726	L8	D743	F10	Q101	D3	R149	G2	R269	H6	R777	O6
C179	F5	C271	J8	C727	L8	D744	F10	Q102	G5	R151	G3	R270	H6	R778	O6
C185	B4	C272	I8	C728	E6	D745	H10	Q103	G1	R152	G3	R271	J8	R779	E8
C186	B4	C275	I8	C729	F10	D746	H10	Q105	C1	R153	H2	R272	J8	SW601	N1
C187	I4	C276	I8	C730	F10	D747	H10	Q106	D1	R156	F3	R273	J7	TP101	E3
C188	H4	C277	I9	C731	B7	D748	H10	Q107	H3	R165	B4	R274	K7	TP102	E3
C190	D2	C278	I9	C732	L11	D781	C5	Q108	G3	R166	B4	R275	J7	TUN101	D4
C195	B2	C280	J7	C733	D9	D782	C6	Q115	G2	R167	B4	R276	P10	X104	E4
C196	C2	C281	J6	C735	E10	D783	D6	Q201	I6	R168	B4	R277	P10	ZD703	L8
C197	D4	C282	P9	C736	I10	D785	J11	Q202	J6	R181	I4	R280	I7	ZD704	L11
C198	J2	C283	O11	C737	L10	FB101	I4	Q203	K7	R182	H4	R281	I8		
C199	G2	C284	P11	C738	J10	FB102	H4	Q204	P11	R191	I2	R282	I8		
C201	G9	C285	P10	C739	K10	FB103	I4	Q205	O11	R192	F2	R283	I8		
C202	H8	C286	O10	C740	K11	FB104	D5	Q206	F8	R201	G9	R284	I9		
C203	K5	C287	O9	C741	K11	FB115	D4	Q207	F7	R202	G8	R285	I9		
C204	G9	C290	J6	C742	P5	FB117	B3	Q208	F6	R203	G9	R286	I9		
C205	G9	C292	I6	C745	L9	FB201	H9	Q251	H6	R204	F8	R287	I9		

• FRONT P.C. BOARD(COMPONENT SIDE)

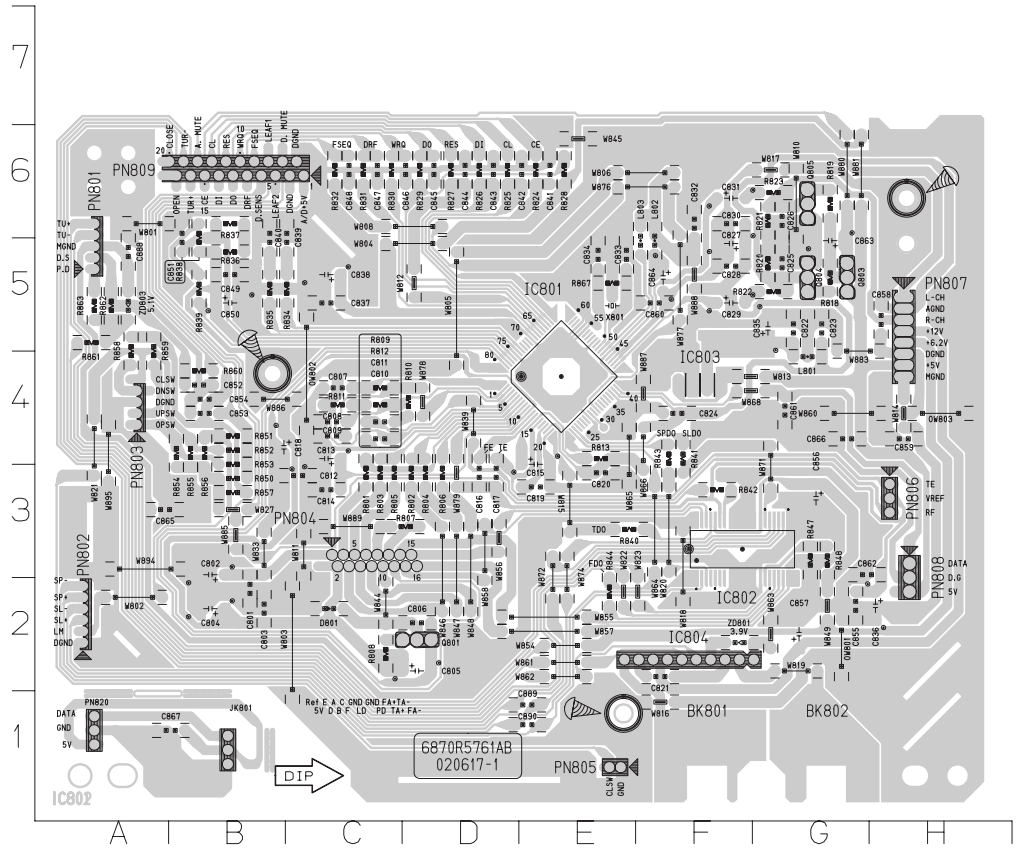


C301	H5	FB301	C8	R337	F3	R393	J6	R520	C4
C302	J2	FB302	D6	R338	E3	R394	J6	R521	C4
C303	C8	FB303	C5	R339	F3	R395	J6	R522	C4
C304	D8	FIP301	I7	R340	E3	R396	J6	R523	C4
C305	J7	LD301	C7	R341	D3	R397	B7	R524	E4
C306	J6	PN301	B4	R342	D3	R398	C6	R525	F4
C307	K5	PN320	B2	R343	D7	R399	C7	R526	G4
C308	E6	Q302	D6	R344	D4	R3A1	H8	R527	G3
C309	E6	Q303	C7	R345	E7	R3A10	G8	R528	L5
C310	E5	Q304	D7	R347	D3	R3A11	G8	R529	L6
C311	E5	Q310	G2	R348	D4	R3A12	G8	R530	L6
C316	D5	Q311	F2	R349	D4	R3A13	G8	R531	L7
C317	E5	Q312	E2	R350	G2	R3A14	G8	R532	L7
C322	D5	Q313	G2	R351	F2	R3A15	G8	RM301	I7
C323	D6	Q314	H2	R352	E2	R3A16	G8	SW501	A6
C324	D6	Q315	H2	R353	F2	R3A17	F8	SW502	B7
C345	D7	Q316	F2	R354	G3	R3A18	F8	SW503	D1
C346	C7	Q322	E2	R355	G3	R3A19	F8	SW504	E1
C351	C6	Q333	J2	R356	D2	R3A2	H8	SW505	F1
C353	B6	Q345	D7	R357	G3	R3A20	F8	SW506	G1
C354	C7	R302	C6	R358	H2	R3A21	F8	SW507	H1
C355	C6	R303	C5	R359	G2	R3A22	F8	SW508	I1
C356	C6	R305	B6	R360	G3	R3A23	F8	SW509	H2
C357	C7	R306	E6	R361	G3	R3A24	E8	SW510	G2
CN203	K3	R307	E6	R362	F3	R3A25	E8	SW511	F2
CN307	L4	R308	J7	R363	G3	R3A26	E8	SW512	E2
CN809	K5	R309	I8	R364	G3	R3A27	E8	SW513	D2
D303	H7	R310	I8	R365	G3	R3A28	E8	SW551	C4
D304	H7	R311	E8	R368	E2	R3A3	H8	SW552	C4
D305	H7	R312	E8	R371	B5	R3A4	H8	SW553	B3
D306	H7	R313	E6	R372	B5	R3A5	H8	SW554	C3
D307	H7	R314	K4	R373	B5	R3A6	H8	SW555	E3
D308	H7	R317	K5	R374	B5	R3A7	H8	SW556	E4
D309	G7	R318	K5	R375	C7	R3A8	H8	SW557	G4
D310	G7	R319	K5	R378	C4	R3A9	G8	SW558	G3
D311	G7	R320	K4	R379	B5	R501	B6	SW559	L5
D312	G7	R321	F5	R381	B6	R502	D2	SW560	L6
D313	G7	R322	F5	R382	J6	R503	D1	SW561	L6
D314	C6	R323	I7	R383	J5	R504	E1	SW562	L7
D315	J7	R324	J3	R384	J5	R505	F1	SW563	L7
D316	B6	R325	J3	R385	J5	R506	G2	VR301	J4
D317	C4	R327	C7	R386	J5	R507	H2	VR302	I4
D318	L4	R331	F4	R387	J5	R508	I2	X301	F5
D319	J7	R332	E4	R388	J5	R509	H2	X302	E5
D320	E3	R333	F4	R389	J5	R510	G2	X351	C6
D321	F3	R334	E4	R390	J5	R511	F2	ZD302	D8
D345	D7	R335	D4	R391	J6	R512	E2		
D351	C5	R336	F4	R392	J6	R513	E2		

• FRONT P.C. BOARD(SOLDER SIDE)



• CD MAIN P.C. BOARD

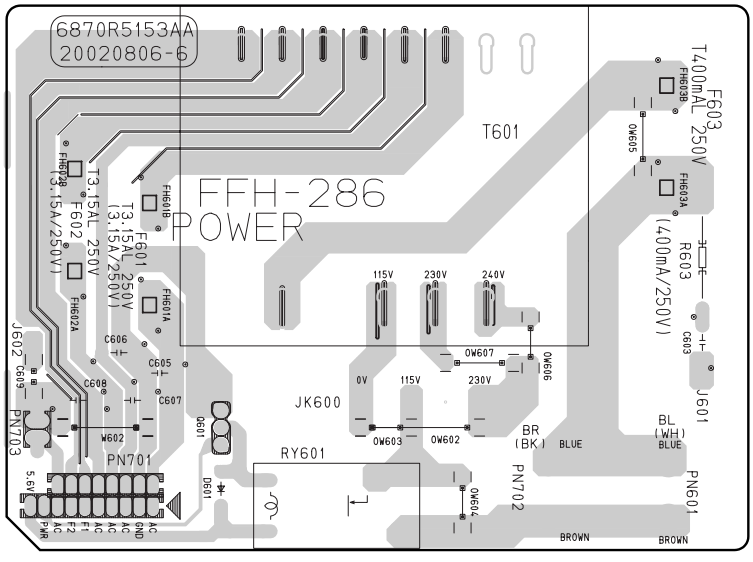


C801	B2	OW801	G2
C802	B3	OW802	C4
C803	B2	OW803	H4
C804	B2	PN801	A5
C805	D2	PN802	A2
C806	D2	PN803	A4
C807	C4	PN804	C3
C808	C4	PN805	E1
C809	C4	PN806	H3
C810	C4	PN807	H5
C811	C4	PN808	H3
C812	C3	PN809	C6
C813	C4	PN820	A1
C814	C3	Q801	D2
C815	E3	Q803	G5
C816	D3	Q804	G5
C817	D3	Q805	G6
C818	B4	R801	C3
C819	E3	R802	D3
C820	E3	R803	C3
C821	F2	R804	D3
C822	G5	R805	C3
C823	G5	R806	D3
C824	F4	R807	D3
C825	G5	R808	C2
C826	G6	R809	C4
C827	F5	R810	D4
C828	F5	R811	C4
C829	F5	R812	C4
C830	F6	R813	E4
C831	F6	R818	G5
C832	F6	R819	G6
C833	E5	R820	G5
C834	E5	R821	G6
C835	G5	R822	G5
C836	H2	R823	G6
C837	C5	R824	E6
C838	C5	R825	D6
C839	C5	R826	D6
C840	B5	R827	D6
C841	E6	R828	E6
C842	E6	R829	D6
C843	D6	R830	C6
C844	D6	R831	C6
C845	D6	R832	C6
C846	D6	R834	C5
C847	C6	R835	B5
C848	C6	R836	B5
C849	B5	R837	B6
C850	B5	R838	B5
C851	B5	R839	B5
C852	B4	R840	E3
C853	B4	R841	F4
C854	B4	R842	F3
C855	G2	R843	F4
C856	G3	R844	E2
C857	G2	R847	G3
C858	H5	R848	G3
C859	H4	R850	B3
C860	F5	R851	B4
C861	G4	R852	B4
C862	G3	R853	B3
C863	G5	R854	B4
C864	F5	R855	B4
C865	A3	R856	B4
C866	G4	R857	B3
C867	B1	R858	A4
C888	A5	R859	A4
C889	E1	R860	B4
C890	E1	R861	A5
D801	C2	R862	A5
IC803	F4	R863	A5
IC804	G2	R867	E5
L801	G4	X801	E5
L802	F5	ZD801	F2
L803	F5	ZD803	A5

• AMP & POWER P.C. BOARD

NOTE: Warning

⚠ Parts that are shaded are critical With respect to risk of fire or electrical shock.



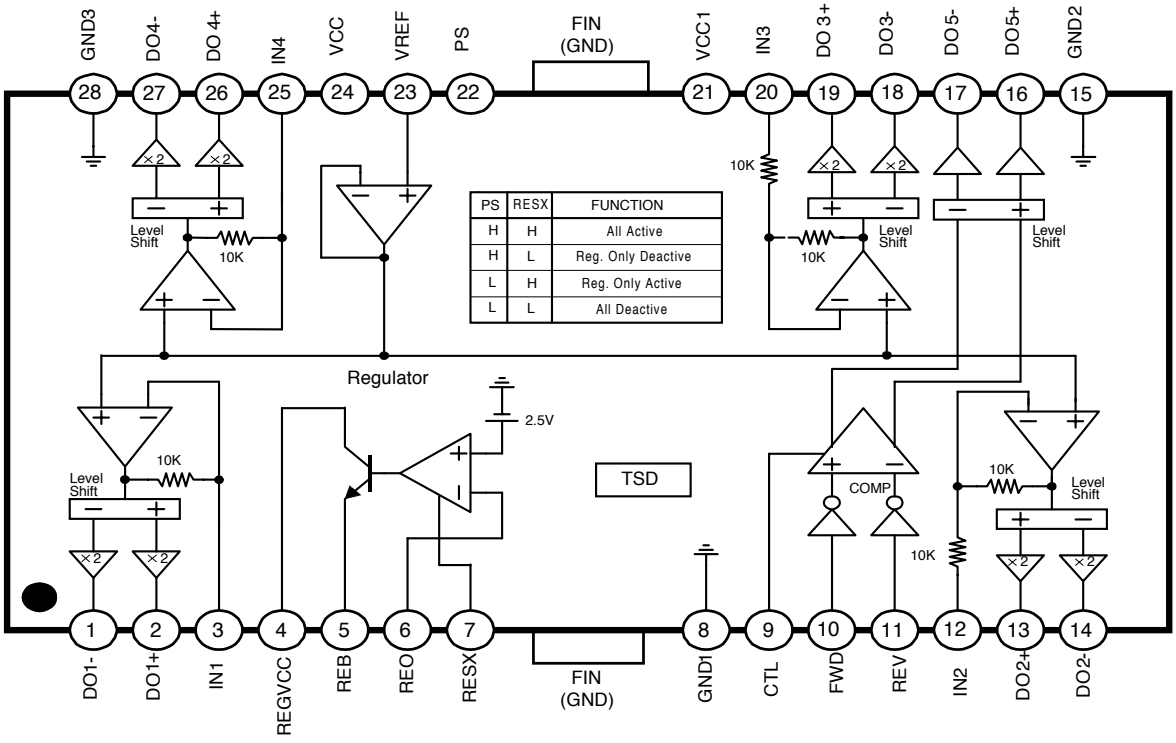
INTERNAL BLOCK DIAGRAM OF ICs

■ FAN8039BD3

5-CH Motor Diver

Description

The FAN8039BD3 is a monolithic integrated circuit suitable for a 5-CH motor driver which drives the tracking actuator, focus actuator, sled motor, tray motor, spindle motor of the DVDP/CAR-CD systems.



Pin Definitions

NO	Symbol	Description	NO	Symbol	Description
1	DO1-	CH1 Drive Output (-)	15	GND2	Power Ground1 (CH 2,3,5)
2	DO1+	CH1 Drive Output (+)	16	DO5+	CH5 Drive Output (+)
3	IN1	CH1 Drive Input	17	DO5-	CH5 Drive Output(-)
4	REGVCC	Regulator Supply Voltage	18	DO3-	CH3 Drive Output(-)
5	REB	Regulator Output	19	DO3+	CH3 Drive Output (+)
6	REO	Regulator Feedback Input	20	IN3	CH3 Drive Input
7	RESX	Regulator Reset	21	VCC1	Supply Voltage1(CH2,CH3,CH5)
8	GND1	Signal Ground	22	PS	Power Save
9	CTL	CH5 Motor Speed Control	23	VREF	Bias Voltage
10	FWD	CH5 Forward Input	24	VCC	Supply Voltage(CH1,CH4)
11	REV	CH5 Reverse Input	25	IN4	CH4 Drive Input
12	IN2	CH2 Drive Input	26	DO4+	CH4 Drive Output (+)
13	DO2+	CH2 Drive Output (+)	27	DO4-	CH4 Drive Output (-)
14	DO2-	CH2 Drive Output (-)	28	GND3	Power Ground2 (CH 1,4)

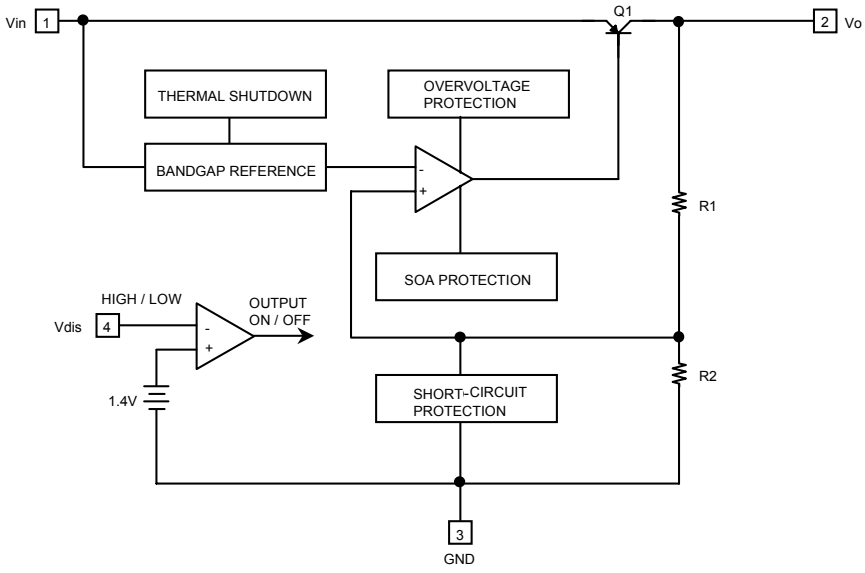
■ KA78R33

Low Dropout Voltage Regulator

Description

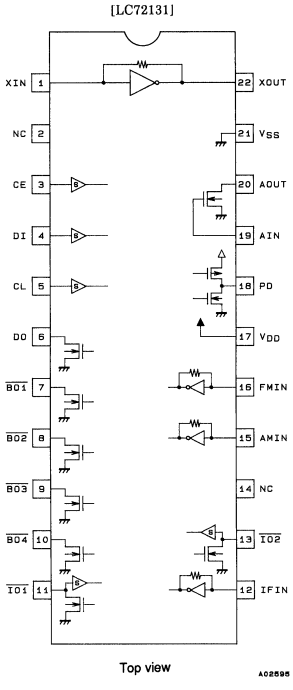
The KA78R33 is a low-dropout voltage regulator suitable for various electronic equipments. It provides constant voltage power source with TO-220 4 lead full mold package. Dropout voltage of KA78R33 is below 0.5V in full rated current(1A). This regulator has various function such as peak current protection, thermal shut down, overvoltage protection and output disable function.

Internal Block Diagram

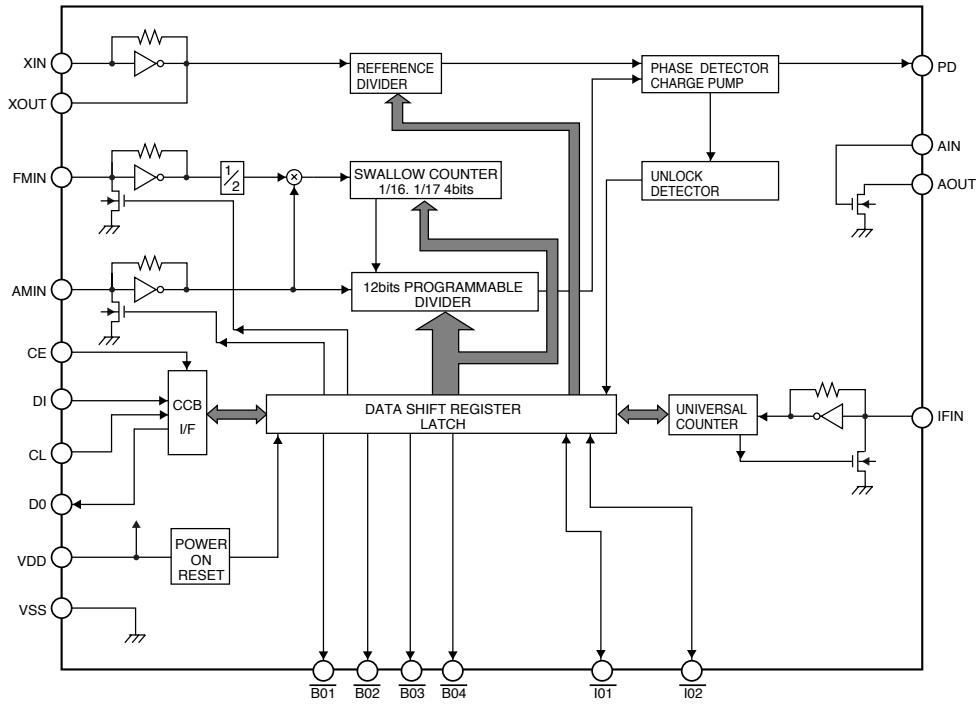


■ LC72131

AM/FM PLL Frequency Synthesizer



Block Diagram

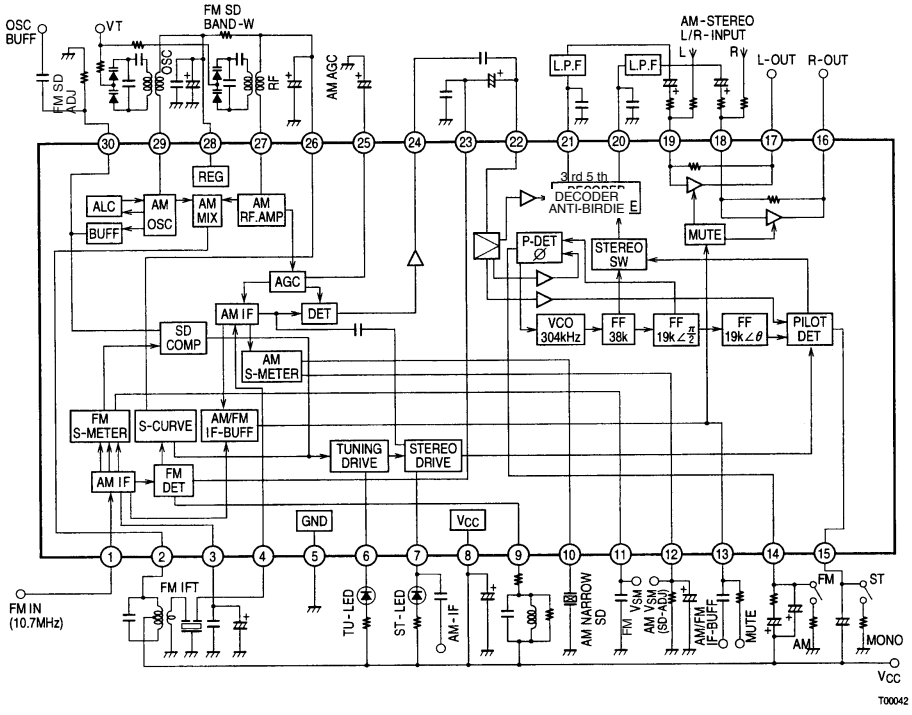


■ LA1837

Single-Chip Home stereo IC with Electronic Tuning Support

The LA1837 is a single-chip AM/FM IF and MPX IC that supports electronic tuning and was developed for use in home stereo systems. It is optimal for use in automatic station selection systems that use the SD and IF counting techniques.

Block Diagram



■ KIA 78R12 PI

4 TERMINAL LOW DROP VOLTAGE REGULATOR

The KIA78RXX Series are Low Drop Voltage Regulator suitable for various electronic equipments. It provides constant voltage power source with TO-220 4 termainal lead full molded PKG. The Regulator has multi function such as over current protection, overheat protection and ON/OFF control.

ELECTRICAL CHARACTERISTICS
(Unless otherwise specified, I_O=0.5A, Ta=25℃, Note1.)

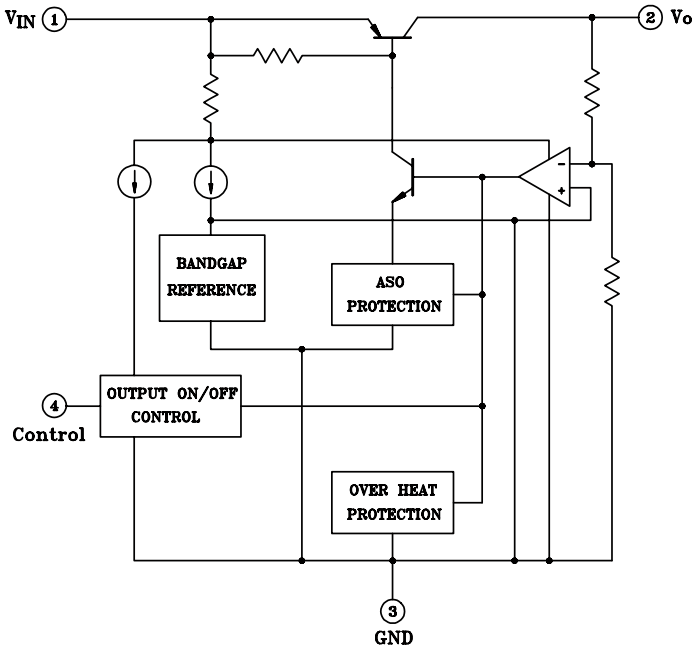
CHARACTERISTIC		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	KIA78R05	V_O	-	4.88	5.0	5.12	V
	KIA78R06		-	5.85	6.0	6.15	
	KIA78R08		-	7.80	8.0	8.2	
	KIA78R09		-	8.78	9.0	9.22	
	KIA78R10		-	9.75	10.0	10.25	
	KIA78R12		-	11.70	12.0	12.30	
	KIA78R15		-	14.70	15.0	15.30	
Load Regulation		Reg Load	I_O=5mA～1A	-	0.1	2.0	%
Line Regulation		Reg Line	(Note 2)	-	0.5	2.5	%
Ripple Rejection		R·R		45	55	-	dB
Drop Out Voltage		V_D	(Note 3)	-	-	0.5	V
Output ON state for control Voltage		$V_{C(ON)}$		2.0	-	-	V
Output ON state for control Current		$I_{C(ON)}$	V_C=2.7V	-	-	20	μA
Output OFF state for control Voltage		$V_{C(OFF)}$	-	-	-	0.8	V
Output OFF state for control Current		$I_{C(OFF)}$	V_C=0.4V	-	-	-0.4	mA
Quiescent Current		I_Q	I_O=0	-	-	10	mA

Note1) V_{IN} of KIA78R05=7V
〃 KIA78R06=8V
〃 KIA78R08=10V
〃 KIA78R09=15V
〃 KIA78R10=16V
〃 KIA78R12=18V
〃 KIA78R15=21V

Note2) V_{IN} of KIA78R05=6～12V
〃 KIA78R06=7～15V
〃 KIA78R08=9～25V
〃 KIA78R09=10～25V
〃 KIA78R10=11～26V
〃 KIA78R12=13～29V
〃 KIA78R15=16～32V

Note3) At V_{IN}=0.95V_O

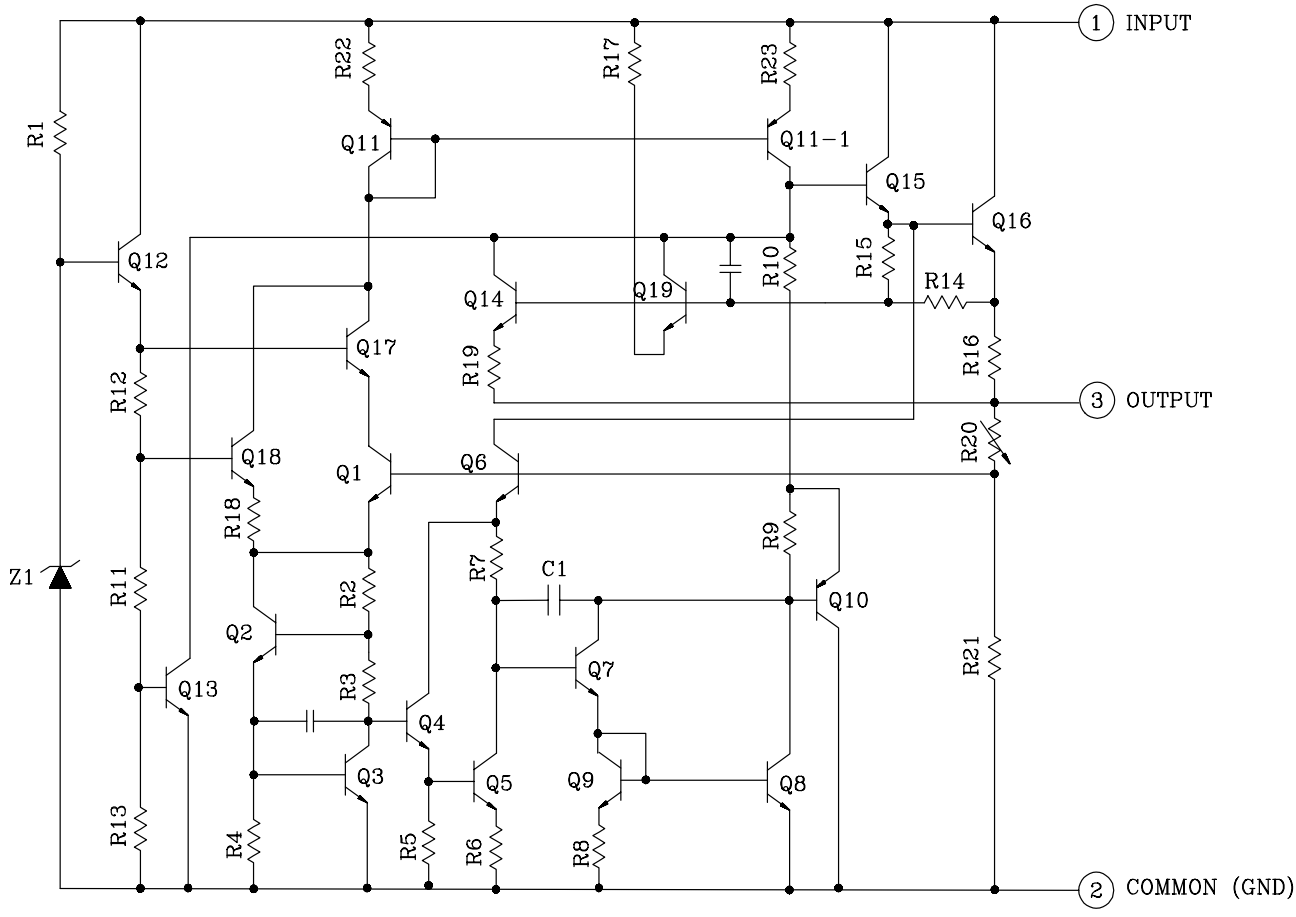
Block Diagram



■ KIA7805AP/API

THREE TERMINAL POSITIVE VOLTAGE REGULATORS 5V, 6V, 8V, 9V, 10V, 12, 15V, 18V, 24V.

EQUIVALENT CIRCUIT



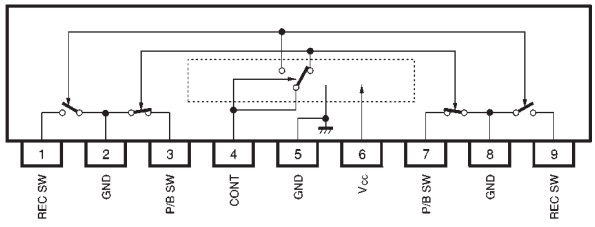
KIA7805AP/API

ELECTRICAL CHARACTERISTICS (V_{IN}=10V, I_{OUT}=500mA, 0℃≦T_j≦125℃)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{OUT}	1	T_j=25℃, I_{OUT}=100mA		4.8	5.0	5.2	V
Input Regulation	Reg line	1	T_j=25℃	7.0V≦V_{IN}≦25V	-	3	100	mV
				8.0V≦V_{IN}≦12V	-	1	50	
Load Regulation	Reg load	1	T_j=25℃	5mA≦I_{OUT}≦1.4A	-	15	100	mV
				250mA≦I_{OUT}≦750mA	-	5	50	
Output Voltage	V_{OUT}	1	7.0V≦V_{IN}≦20V 5.0mA≦I_{OUT}≦1.0A, Po≦15W		4.75	-	5.25	V
Quiescent Current	I_B	1	T_j=25℃, I_{OUT}=5mA		-	4.2	8.0	mA
Quiescent Current Change	ΔI_B	1	7.0V≦V_{IN}≦25V		-	-	1.3	mA
Output Noise Voltage	V_{NO}	1	Ta=25℃, 10Hz≦f≦100kHz I_{OUT}=50mA		-	50	-	μV_{rms}
Ripple Rejection Ratio	RR	1	f=120Hz, 8.0V≦V_{IN}≦18V, I_{OUT}=50mA, T_j=25℃		62	78	-	dB
Dropout Voltage	V_D	1	I_{OUT}=1.0A, T_j=25℃		-	2.0	-	V
Short Circuit Current Limit	I_{SC}	1	T_j=25℃		-	1.6	-	A
Average Temperature Coefficient of Output Voltage	TC_{VO}	1	I_{OUT}=5mA, 0℃≦T_j≦125℃		-	-0.6	-	mV/℃

■ BA3126N

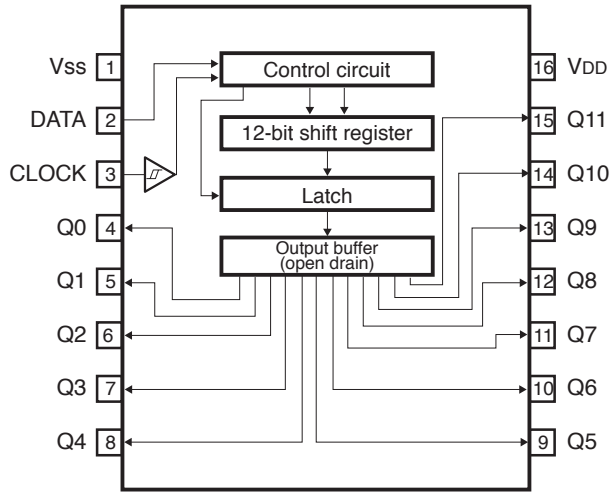
2-channel head switch for radio cassette recorders



■ BU2090F

12-bit, Serial IN, Parallel OUT driver

Block diagram

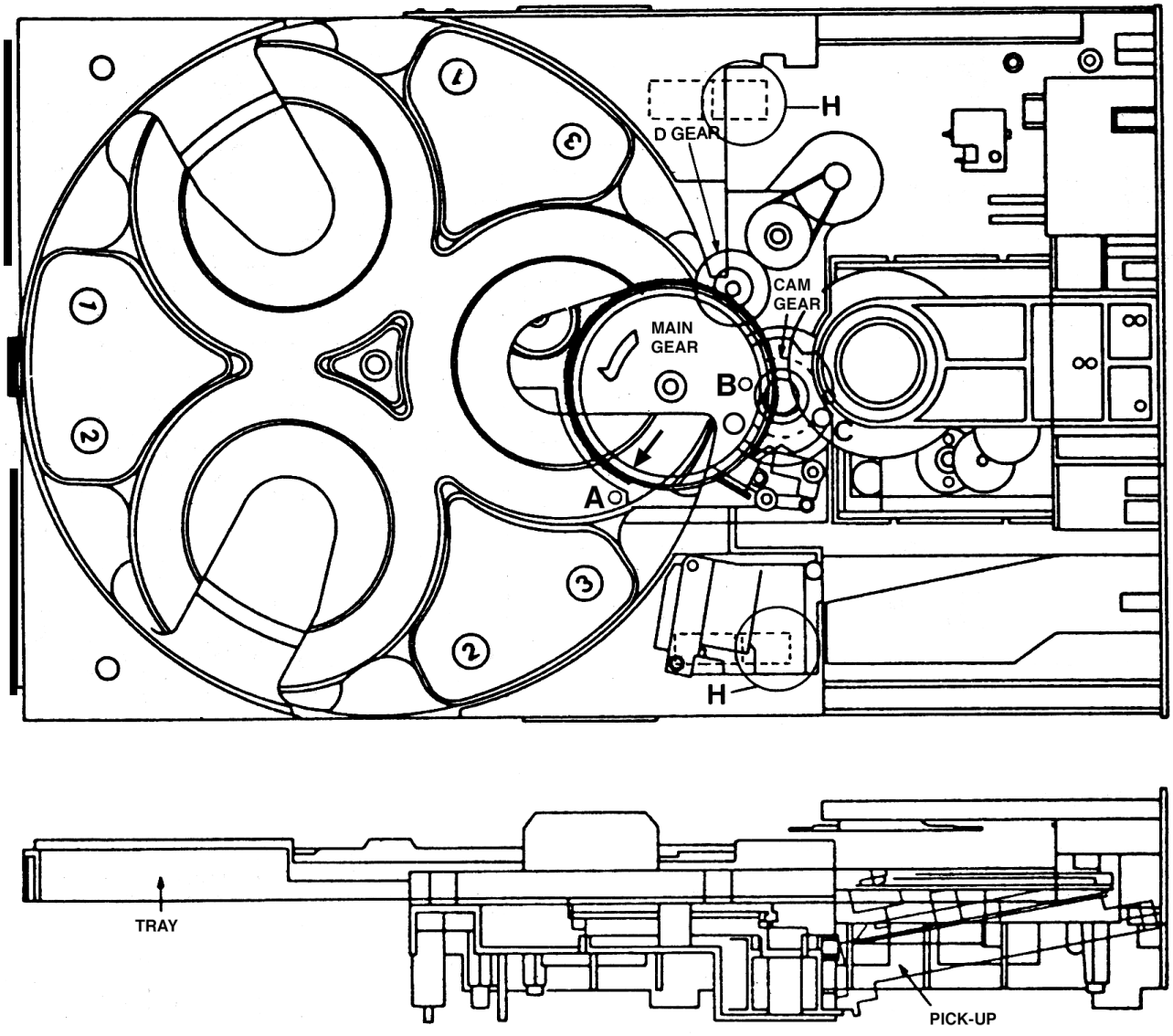


PIN DESCRIPTION

Pin No.			Pin name	Function
BU2090/F/FS	BU2092/F	BU2092/FV		
1	1	1	Vss	GND
2	2	2	DATA	Serial data input
3	3	3	CLOCK	Data shift clock input
-	4	4	LCK	Data latch clock input
4	5	5	Q0	parallel data output
5	6	6	Q1	parallel data output
6	7	7	Q2	parallel data output
7	8	8	Q3	parallel data output
8	9	9	Q4	parallel data output
9	10	10	Q5	parallel data output
10	11	11	Q6	parallel data output
-	-	12	N.C.	Not connected
-	-	13	N.C.	Not connected
11	12	14	Q7	parallel data output
12	13	15	Q8	parallel data output
13	14	16	Q9	parallel data output
14	15	17	Q10	parallel data output
15	16	18	Q11	parallel data output
-	17	19	$\overline{OE}$	Output Enable
16	18	20	VDD	Power supply

REPAIRS REGARDING CD MECHANISM

IMPROVED METHOD - WHEN THE TRAY GEARS WERE DISTORTED



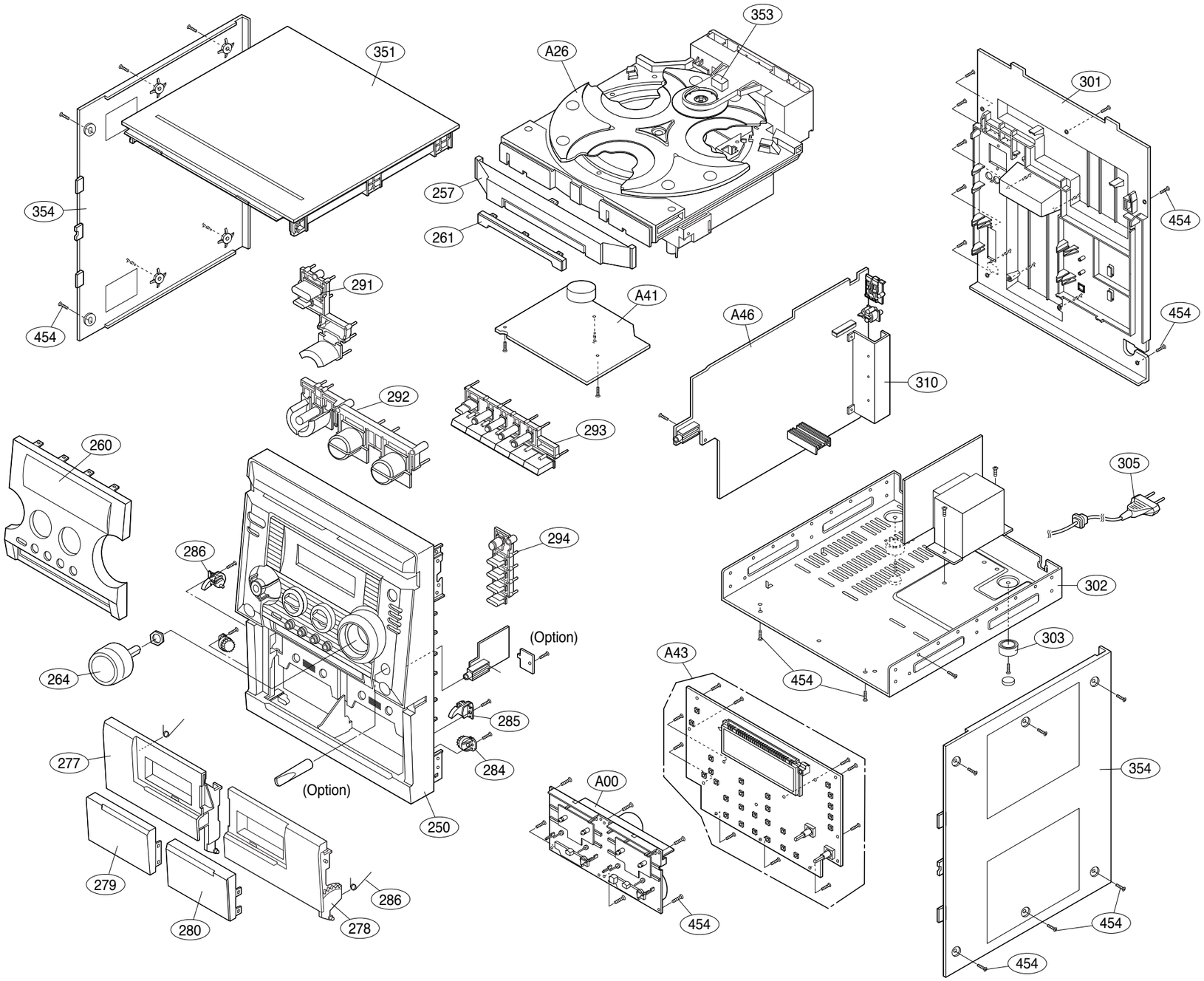
1. How to open the tray.
   In case of not suppling power push two hooks (H) of the base, and them open the tray.
2. How to improve the distorted gears.
   (1) Do the hole "C" of the cam gear to face forward the pick-up so the pick-up is down like figure.
   (2) Do the hole "B" of main gear to face forward pick-up, too.
   (3) Set the last part of main gear to point "A".
   (4) Push the tray to end.

MEMO

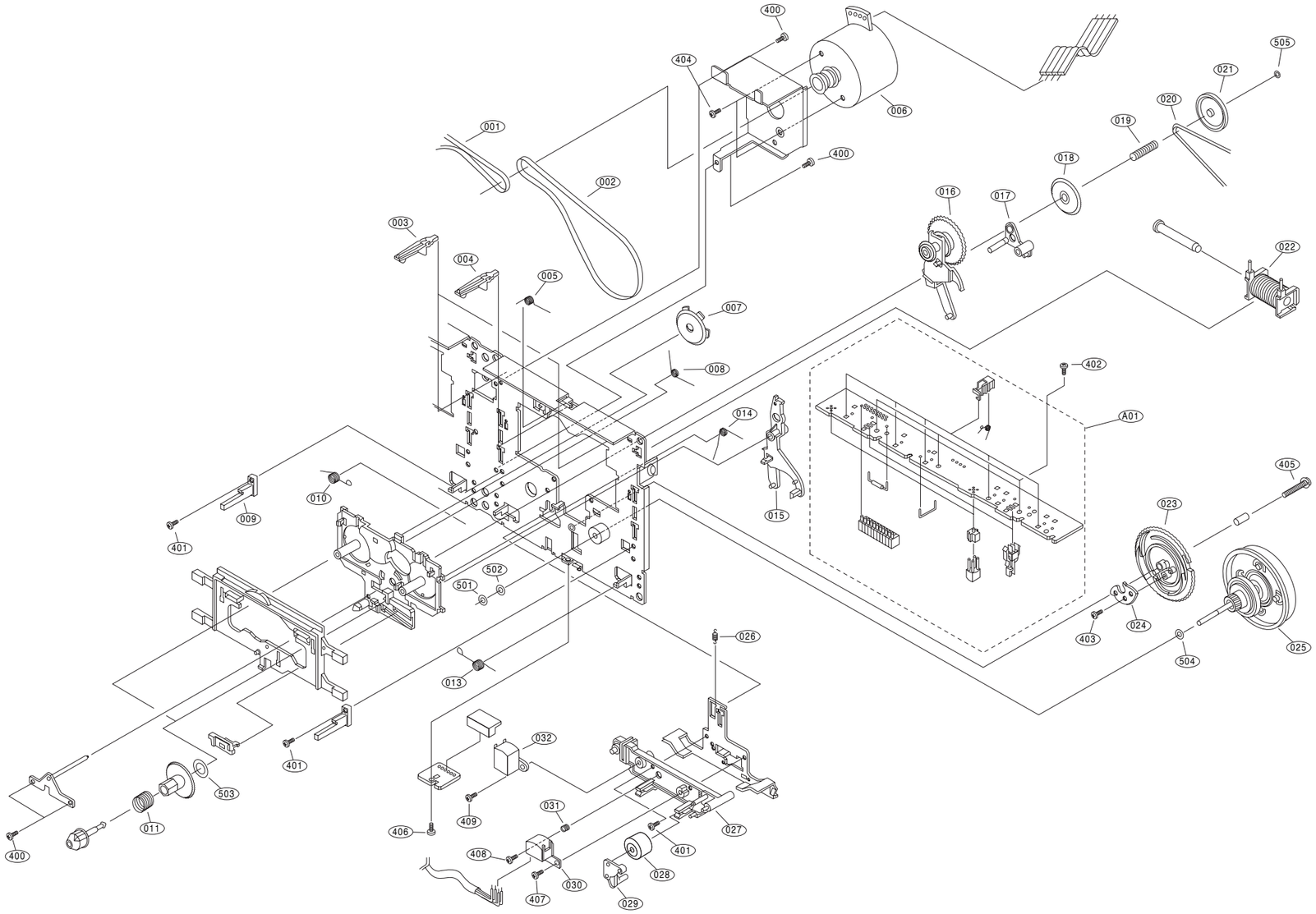
SECTION 3. EXPLODED VIEWS

• CABINET AND MAIN FRAME SECTION

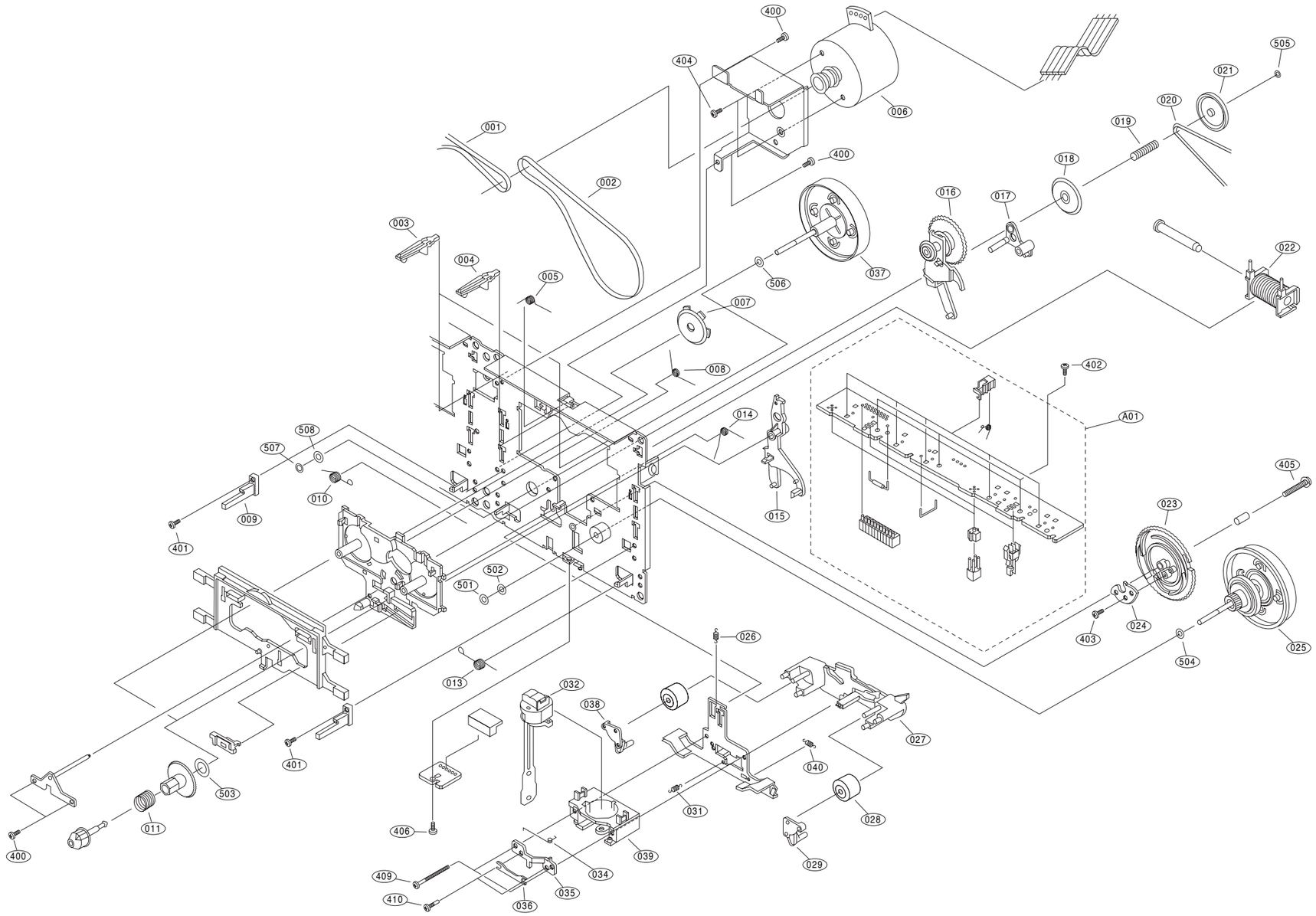
NOTE) Refer to "SECTION 5 REPLACEMENT PARTS LIST" in order to look for the part number of each part.



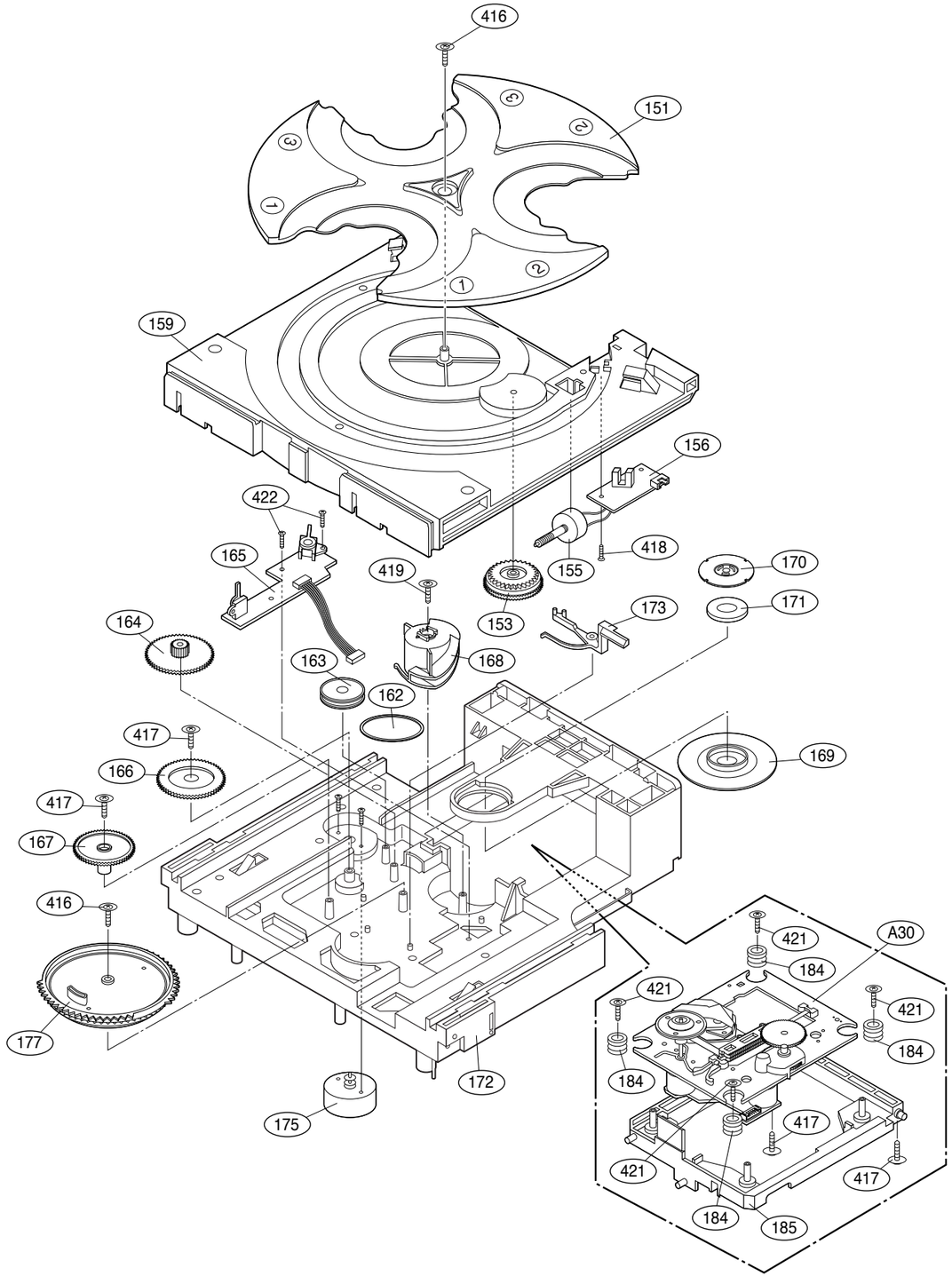
• TAPE DECK MECHANISM: AUTO STOP DECK(OPTIONAL)



• TAPE DECK MECHANISM: AUTO REVERSE DECK

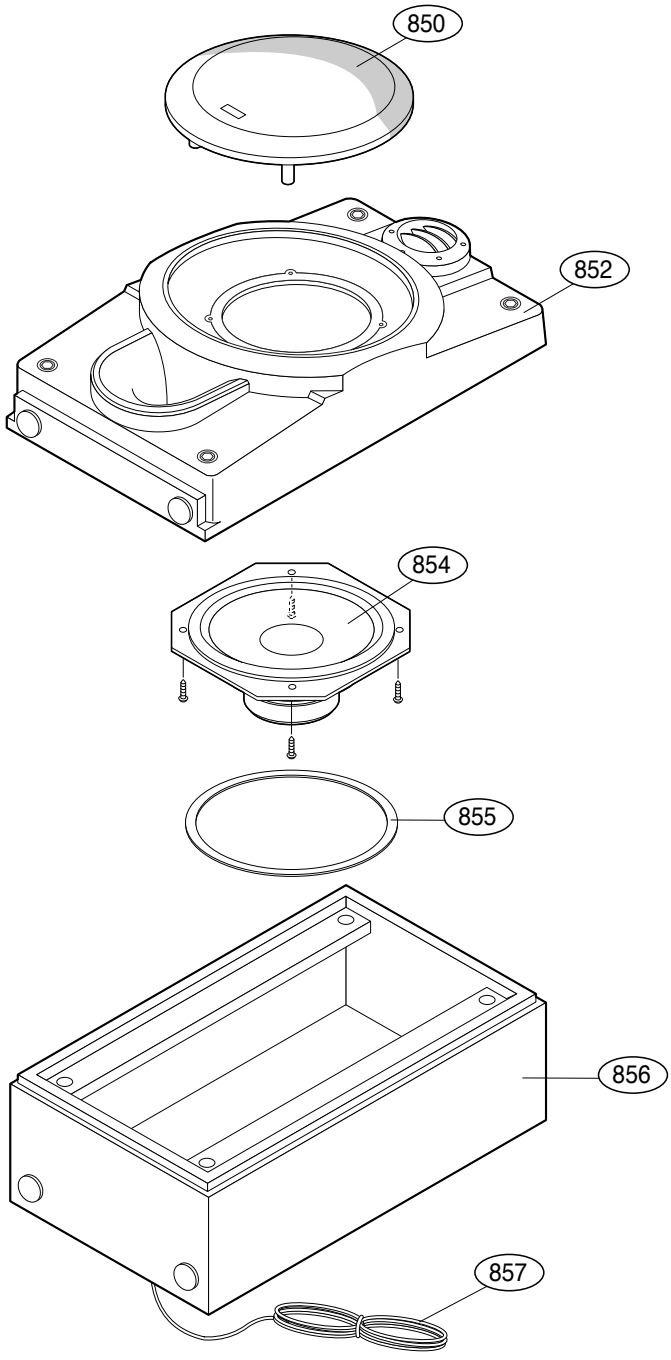


• CD MECHANISM



SECTION 4. SPEAKER SECTION

MODEL: FE-286E



MEMO